

















# The Glasgow ✧ Naturalist

THE JOURNAL OF THE  
GLASGOW AND ANDERSONIAN NATURAL HISTORY  
AND MICROSCOPICAL SOCIETY

(Including the *Transactions* and *Proceedings* of the Society)



Volume XIV.

Edited by

DONALD PATTON, M.A., B.Sc., Ph.D., F.R.S.E., F.G.S.

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## CONTENTS.

|  | PAGE               |
|--|--------------------|
| <b>IN MEMORIAM—</b>                                    |                    |
| Robert Garry, B.Sc. - - - - -                          | 42                 |
| John Robertson - - - - -                               | 43                 |
| Lawrence Watt - - - - -                                | 44                 |
| Alexander Ross, F.E.I.S. - - - - -                     | 48                 |
| Robert Henderson - - - - -                             | 50                 |
| Hugh Boyd Watt, F.Z.S., M.B.O.U. - - - - -             | 99                 |
| Thomas M'Grouther, F.S.A.(Scot.) - - - - -             | 101                |
| John G. Cree - - - - -                                 | 125                |
| <b>PAPERS—</b>   |                    |
| The Structure of the Peristome in Various Mosses - - - | 1                  |
| John R. Lee.   |                    |
| Birds of Darvel and District - - - - -                 | 24                 |
| Nicol Hopkins.   |                    |
| Some Recent Advances in Plant Microscopy - - -         | 53                 |
| Gordon Rattray, Ph.C.                                  |                    |
| The Black-Tailed Godwit - - - - -                      | 73                 |
| Wm. Rennie.  |                    |
| The Fulmar Petrel in the Clyde Area - - - - -          | 75                 |
| Thomas Robertson                                       |                    |
| Possil Marsh : A Retrospect - - - - -                  | 105                |
| Wm. Rennie.  |                    |
| Coal Seams of Auchentorlie and Arbuck Glens - - -      | 118                |
| Wm. J. Cannon.   |                    |
| Return of Summer Birds to the Clyde Area - - -         | 33, 75, 120        |
| Thomas Robertson.                                      |                    |
| <b>DIGEST OF THE PROCEEDINGS OF THE SOCIETY - - -</b>  | <b>35, 79, 122</b> |
| <b>NOTES FROM EXCURSION REPORTS - - - - -</b>          | <b>- 41, 97</b>    |
| <b>NOTES FROM SECTIONAL REPORTS - - - - -</b>          | <b>88, 129</b>     |
| <b>INDEX - - - - -</b>                                 | <b>131</b>         |



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1940

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DONALD PATTON, M.A., B.Sc., Ph D., F.R.S.E.

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## SUMMARY OF CONTENTS

| PAPERS—   | PAGE. |
|---|-------|
| The Structure of the Peristome in various Mosses,<br>John R. Lee.               | 1     |
| Birds of Darvel and District,<br>Nicol Hopkins.                                 | 24    |
| Return of Summer Birds to the Clyde Area in 1938 and 1939,<br>Thomas Robertson. | 33    |
| DIGEST OF THE PROCEEDINGS OF THE SOCIETY,                                       | 35    |
| NOTE FROM EXCURSION REPORTS,  | 41    |
| IN MEMORIAM—  |       |
| Robert Garry, B.Sc. (21/1/38).<br>By Robert M'Lean, M.A.                        | 42    |
| John Robertson (6/4/38)<br>By John R. Lee.                                      | 43    |
| Lawrence Watt (20/1/39)<br>By John R. Lee.                                      | 44    |
| Alex. Ross, F.E.I.S. (4/4/40)<br>By Archibald Shanks.                           | 48    |
| Robert Henderson (12/7/40)<br>By Archibald Shanks.                              | 50    |

ERRATA — VOL. XIII.

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- p. 69, line 24, for “June” read “January”.  
p. 71, line 22, for “at a” read “at no”.  
p. 74, line 12, for “Grey-leg” read “Grey Lag”.





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## **"THE STRUCTURE OF THE PERISTOME IN VARIOUS MOSSES."**

(THE "PETER GOODFELLOW" LECTURE.)

By JOHN R. LEE.

[Delivered 9th December, 1939.]

Mosses, like all the higher forms of "cryptogamic" plants are reproduced by spores. These are produced in countless numbers in the form of a fine dust composed of single separate cells each provided with a firm outer wall by which the living protoplasmic contents are protected during the more or less extended period between the discharge of the spores from the mother plant and the finding of a favourable substratum and the conditions necessary for germination. This fine dust is discharged into the air from the so-called "capsules" of mosses; and it is probably quite correct to say that it constitutes a very considerable proportion of the great army of "germs" of various kinds with which our atmosphere is everywhere charged. As we know, mosses of one kind or another make their appearance readily in the crevices of walls, on the surfaces of stones, on the ground and on the bark of trees—in fact, wherever suitable con-

ditions for their development exist. Some species are very common and widely distributed; others, as in the case of all forms of vegetation, are more restricted, and some are decidedly rare. In a very large number of cases there is provision made for subsidiary means of propagation without the development of spores—as by the separation of branches from the mother plant, or by the production of “gemmae”. Such secondary means of reproduction are of great importance when, as is frequently the case, mosses are found growing in places and under conditions which are unsuitable for the production of the “capsules” or for the germination of spores if and when the latter may be formed. When, however, the right kind of environment exists, and the plants develop their spores normally, it is obviously a matter of primary importance that the arrangements for the proper discharge and distribution of the spores should be effective. This subject of the means by which the spores of the higher cryptogams are discharged is a very interesting one. The elastic mechanism in the case of the sporangia of Ferns is a very beautiful example; so also is the remarkable provision of hygroscopic thread-like attachments to the spores themselves in the case of Horsetails. In Liverworts, too,—the forms most nearly allied to the mosses—the provision of the so-called “elaters” mixed with the spores forms a study in itself. In Mosses an essential part of the process of spore distribution depends upon the remarkable structure called the “peristome”—a structure peculiar to this group of plants, about the details of which the present paper purports to give a short account.

If we examine plants of the common wall Bryum (*B. capillare*) about this time of year (February) we may observe that besides the fresh bright green patches of its vegetative stems there arise from these numerous reddish stalks about



an inch or so in height, each bearing at its apex a small oblong-cylindrical body which is either inclined or pendulous (according to the stage of development—the vertically pendulous position being assumed when fully mature). This sac-like body is the “capsule” or *sporogonium*—bright green when young, becoming tawny brown when ripe—in which the spores are produced (fig. 1). During the process of the development of the latter a series of most remarkable changes takes place within the “capsule” into the details of which, however, it is impossible to enter at present. The time taken by these changes, from the point when the capsule itself attains its full development until the spores are ripe and ready for discharge into the air, varies greatly in different species, in some occupying only a few days, while in others several months elapse. In the case of the common moss we are looking at, the young capsules will be found abundant about February or March, but the ripe spores are discharged about midsummer—June-July. An examination of the ripe capsules at this latter season will show that they are now dried up. The tissues of which the capsule-walls are composed are in fact dead, and their only remaining function is as a temporary receptacle for the spores until these have been got rid of.

If at this point in the life-history the capsules are examined by means of a lens, it will be seen that the open mouth of the structure is surrounded by a very elegant fringe of teeth in a double row (fig. 1*b*). This is the so-called “peristome”—and to its nature and significance I invite your attention for a little.

An examination of the capsules of various kinds of mosses soon reveals the fact that there is considerable diversity in the form of the peristome. Sometimes this structure is very elaborate; in other cases it is comparatively simple. Occasion-

ally it is imperfectly developed, and sometimes fugitive—breaking off easily; in a comparatively small number of species it is absent altogether. In a large number of cases the teeth are in a single row; whilst in others—as in the case of the *Bryum*—the peristome is double. When present, the peristome, whether single or double, always consists of teeth numbering either four or some multiple of that number—in fact, the number of teeth is always either four, eight, sixteen, thirty-two or sixty-four, no other numbers being known.

Taking first the “single” type of peristome, a very beautiful example may be seen in the little moss *Fissidens bryoides*, very common on banks and on the ground in shady woods, especially on clay soil. Here the peristome consists of sixteen teeth, each divided for more than half its length into two slender prongs (fig. 2). The teeth are of a deep blood-red colour and make an exceedingly elegant object under the microscope; but they can be seen quite easily with the naked eye, and under a good lens their structure can be made out without difficulty. They consist of strips of cellulose which have undergone a certain amount of thickening or lignification during the development of the cellular tissue of which they are the remains. They are very highly sensitive to variations in the moisture of the air, bending inwards over the orifice of the capsule when the atmosphere is charged with moisture, and rapidly rising and spreading outwards when the air dries. It is this “hygroscopic” sensitivity which renders the peristome such an efficient organ for the dispersal of the spores. As the capsule dries up when ripe its walls contract to some extent, and the mass of spores is gradually squeezed out of its mouth. Here the spores are caught and held lightly by the peristome teeth. In rainy weather, when conditions are

more or less unfavourable for the proper dissemination of the spores, the incurving of the teeth prevents their escape; but when the air dries the teeth spring upwards with some violence, and the spores are shot out in little clouds to be carried away by air-currents. The action is a very beautiful one, and it can be quite easily observed by gently breathing upon the open capsule so as to contract the teeth, and then watching the movements of the teeth by means of a lens.

There is considerable diversity in the form of the teeth in different species. Sometimes the teeth are undivided; but it is more common for them to be split into two or sometimes three to a varying extent from the apex downwards. In some cases the division is down to the base, when the peristome appears to have thirty-two teeth although in reality there are only sixteen. The distance between the teeth also varies considerably, in some cases there being quite a gap between them, while in others they stand close together. Whatever the form, however, it remains constant for the species, and sometimes also for whole genera, and even throughout whole orders; so that the peristome sometimes constitutes a valuable character in classification.

We may now compare with this simple form of the peristome the more complex "double" one seen in a very large number of species. The type found in the common *Bryum* is characteristic of the majority of those mosses in which the peristome is double. Its appearance as seen in one of the numerous forms of the extensive genus *Hypnum* may be taken as an example (fig. 3).

Here the teeth will be seen to consist of two rows, each of sixteen, but differing greatly in appearance. The inner row is much more delicate in texture, and usually of a different colour—commonly pale yellowish, whereas the outer

row is generally more or less reddish. Moreover it will be readily seen that the teeth of the two rows are hygroscopic in very different degrees; those of the outer row being very highly sensitive, whilst those of the inner row are much less so, and even in most cases the movement is scarcely perceptible. The effect of this difference is very remarkable. The spores as they emerge from the mouth of the capsule are held lightly by the inner row of teeth, in which they become entangled. With the variations in the moisture of the air the outer teeth are bent backwards at their base, and at the same time their apices bend inwards, so that their tips come into contact with the more rigid processes of the inner peristome row. The action is not unlike that of the fingers of a musician "twanging" the strings of a harp; and the result is to cause a jerky movement of the inner teeth of such violence that the spores are propelled away with some force. It will be seen that this constitutes a very efficient means of spore-dispersal.

These two may be said to be the main types of peristome. There is a great deal of variety in detail among different mosses; but before we turn our attention to this, it may be well to get some idea of the structure and origin of this remarkable organ, and how it is produced in the course of development. It will be found that the teeth are in all cases firmly attached at their bases to the wall of the capsule just within the mouth, and as we have already remarked, they consist of strips of material evidently derived from cellular tissues which have broken down, and except for these remaining strips have entirely disappeared.

The origin and development of the peristome may best be studied by an examination of the tissues of the capsule, as seen in sections taken at an immature stage. A median longitudinal section of a young capsule in the region of what



will eventually be the "mouth" and including the wall of the capsule and the subjacent cell layers just above and below the junction of the body of the capsule with the lid or "operculum" (which will later become detached) will exhibit most of the features of interest for our present purpose (fig. 5). Towards the centre of the section will be seen a mass of parenchymatous cellular tissue extending upwards into the region of the lid. This is the so-called columella, consisting of thin-walled cells and constituting the greater part of the structure in the young state (*a*). In most cases, however, this massive tissue shrivels up and disappears with the ripening of the spores; only in a few cases remaining as a kind of stalk-like body within the ripe capsule. Immediately on the exterior of the columella may be seen a single row of cells with dense protoplasmic contents (*b*)—these are the mother-cells of the spores, constituting the layer known as the "archesporium". Externally to the archesporium is an "air-space" (*c*) traversed by a loose system of thin-walled cells containing numerous chloroplasts, which divides the interior tissues from the few cell-layers (usually four in number) which constitute the capsule wall. The outermost cell-layer is the epidermis, which is always more or less thickened or "cuticularised" exteriorly (*d*).

If now we examine carefully the position of the archesporium and the "air-space" we shall observe that they both extend upwards from the lower part of the capsule to a point just a little below the junction of the capsule wall with the part which is to become the lid or "operculum". The spore-producing layer ends rather abruptly; while the "air-space" is closed above by the base of a rather remarkable looking row of cells with peculiarly thickened tangential walls (*e*). This row of cells extends upwards towards the apex of the section, and is separated by usually three rows

of thin-walled cells from the thickened epidermis of the operculum. This peculiar row of cells is that which will afterwards become the peristome; and it may be observed that at its base it is attached to the rim of the capsule mouth by a few layers of strongly and uniformly thickened cells.

A detailed examination of the layer of cells from which the peristome originates shows that in the case of the plants which have a double peristome the cell-walls on the side nearest the outside of the section are very strongly thickened, and that this thickening extends to some extent (varying in different species) along the transverse walls as well. The inner tangential wall—on the side towards the interior of the section—is also thickened, but usually to a much smaller extent. The structure as seen in longitudinal section may now be compared with the same tissues as seen in transverse section; when the state of affairs will become clear (fig. 6). If the section be taken at a point just above the junction of the capsule-wall and the operculum, the peristome-layer will be found to constitute a circle the outer and inner tangential walls of which are thickened, but the thickening does not extend throughout the whole breadth of the cell—at least in the great majority of cases. In some species the thickening of the inner wall may be complete for some distance from the base of the peristome upwards; but it is generally more or less confined to the middle part of the cells towards the apex of the structure.

As the period of maturity approaches, the cells of the archesporium divide each into four, the “tetrad” thus formed being the special “spore-mother-cells” which eventually round themselves off and become clothed with the thickened “exospore” which is a characteristic feature of the spores when ripe. Meantime the supply of moisture having been



cut off the whole structure of the capsule dries up, the living contents of all cells except the spores themselves disappear, and unthickened cell-walls break down. The lid of the capsule—the so-called “operculum”—becomes detached, the split being in some cases facilitated by the contraction of an elastic ring of cells termed the “annulus” which, however, is not present in all mosses. What remains, then, of the structure is the dried-up capsule wall within which lie the spores in a loose mass, surrounded at the orifice by the thickened portions of the walls of the peristome-layer which constitute the teeth.

It will be observed that the teeth which constitute the outer peristome-layer are, in general, much more strongly thickened than those of the inner layer. This is nearly always the case when the peristome is double, and may be said to be the normal arrangement. The inner peristome-layer is in consequence generally a more delicate structure than the outer one; and in fact its form is very different and in detail is often much more elaborate (fig. 7). Besides the fact that the inner peristome-teeth—or “processes” as they are usually called, to distinguish them from those of the outer layer—are often united together laterally for some distance above the base, the free portions are much thinner in texture, much less highly or scarcely at all hygroscopic, and they are often pierced in the middle by a more or less elongated slit. Moreover, they have frequently alternating with them fine threads or “cilia” to which are sometimes attached at intervals tiny crosspieces known as “appendicula” which are the remains of bits of the cross-walls of the cells from which they have been derived (A). There is considerable variety of structure in these respects which, as it remains constant in particular species and groups of species, is a feature of considerable value in some cases in the determination of affinities.

There is, however, a point of greater and more fundamental importance to be noted in connection with the difference between the double and single forms of peristome. Superficially there appears to be considerable resemblance between the teeth of a single peristome such as is met with in species of *Grimmia*, *Dicranum*, *Fissidens* and other genera and the teeth of the outer row in those mosses where the peristome is normally double. It might naturally be thought, therefore, that the "single" form is simply the outer row with suppression of the inner row. In fact, the earlier observers believed that such was the case; and some even went the length of regarding the inner row of processes as an added structure in a more highly developed form of organism. Hence in some of the older bryological works the term "peristome" is restricted to the outer layer in the case of the mosses where both rows are present; and the inner is referred to as the "endostome". This view, however, has been shown to be based upon a misconception. It is largely due to the researches of a great French observer—Philibert—that we now understand more clearly the true position of affairs.

In all cases the layer of cells which gives rise to the peristome is in the same position—normally the fifth layer counting from the surface of the capsule inwards. The single row of teeth in the normally "single" peristome is, however, the homologue, not of the outer but of the inner row in the normally "double" peristome. That is to say, the thickened cell-walls which become the teeth of the single peristome are on the inner, not the outer, side of the cell-row concerned. Instead of using the terms "peristome" and "endostome" in the old sense, therefore, it would actually be more correct to call the inner row of teeth in the double structure the "peristome" and to refer to the outer row as an "exostome".

All confusion is avoided, however, by using the terms "inner" and "outer" when referring to the two rows in the double peristome.

The difference of origin thus observed is indicated by a very beautiful and delicate feature of the peristome teeth in the two contrasted forms. The larger teeth in the double form consist of two layers of plates, the outer layer being in two series divided by a fine vertical line which is clearly visible on the surface of the tooth when looked at from the exterior side, the inner face of the tooth having no such line, being composed of a single series of plates. In the single peristome the teeth are likewise composed of two layers of plates, but the exterior surface is composed of a single series extending right across the face of the tooth without any dividing line, whereas the interior surface has two series of plates with a dividing line apparent when the tooth is viewed from the inner side. This is a useful mark to distinguish the normally double peristome when, as is sometimes the case, the inner row of teeth is abortive or wanting.

It is evident that this difference of origin indicates a fundamental distinction connected with the phylogenetic derivation of the plants concerned. The whole group of mosses may in consequence be divided into two series on the basis of this character; and this is in fact now accepted as the most satisfactory arrangement of all except those plants, to which I shall refer later, in which the peristome is of a totally different nature. The fact that this is a quite natural and satisfactory method of classification is emphasised when we find that in other respects the plants fall easily into place in such an arrangement. In the case of a few groups we have plants in which there is no peristome. Such "gymnostomous" forms, however, may in many cases be accounted for on the assumption that partial or complete suppression has taken



place—in fact, we know this from the fact that in a few species the teeth are present in rudimentary form. In other cases, where the peristome is definitely absent altogether, there is abundant reason otherwise to regard the plants as allied to forms with a well-developed peristome.

It may be stated quite definitely that the “single” type is found only among what are called “acrocarpous” mosses, those, that is, in which the female organ or “archegonium” occurs at the apex of the more or less erect-growing stem, and which, in consequence, produce the “sporogonium” (the capsule with its seta) apically. The effect of this arrangement is that the apical growth of the main stem is arrested, and the branching of the plant produces a tufted habit, the plants tending to grow in dense cushions or patches.

The usual type of single peristome in such mosses is beautifully developed in such genera as *Dicranum*, *Dicranella*, *Campylopus*, *Fissidens*, *Grimmia*, etc. The main variations in these groups concern the extent to which the teeth are divided at the apex. In the genus *Grimmia*, for example there is great difference among the numerous species, some, like the very common *Grimmia apocarpa* having almost always entire peristome teeth, whilst others—as *Grimmia patens*—have them divided into almost filiform branches.

A very curious and exceedingly beautiful divergence from the usual form of the single peristome is where the teeth become spirally twisted. This is characteristic of a considerable number of species in the genera *Tortula*, *Barbula*, and *Trichostomum*, and a few others. These mosses, particularly those of the genus *Tortula*, have from this feature received the popular name of “screw mosses”. The amount of twisting varies considerably, but is usually constant for the particular species, and thus becomes a feature of value in diagnosis. Sometimes the teeth are united at the base into a tube, which

in some cases extends as much as half way up the length of the peristome. These mosses are for the most part characteristic of rocks and walls; one of them, the extremely abundant *Tortula muralis* being the moss which is nearly always first to make its appearance on a new wall, its spores germinating and giving rise to the "protonema" sometimes even before the mortar is dry. *Tortula subulata*, a plant often seen on old wall-tops and sometimes on banks with a rocky substratum, shows perhaps the most highly developed and handsome of this type of peristome (fig. 8A). One of our native species of *Tortula* is found growing on the bark of trees—an unusual habitat for plants of this group. This is *Tortula laevipila*, where the peristome, though beautifully developed when the capsule first becomes ripe and the operculum falls, is very fragile and fugitive, soon falling away by severance of the tube at the base, suggesting that it may have become obsolete in function owing to the adoption of the arboreal habit.

Although the normally "single" peristome is confined to the "acrocarpous" type of mosses, nevertheless there is a very large number of such plants where the "double" form prevails; while all the "pleurocarpous" forms are included among the ones with double peristome. These latter are the mosses in which the archegonium, and consequently the sporogonium, is developed not from the apex, but laterally from the side of the stem, the effect being that the continued growth in length is indefinite. It follows from this that the plants may attain considerable size; the plants are commonly more or less creeping in habit, and the branching of the stem is often copious. It will be readily understood from this that the plants with double peristome include many forms of very varied habit and occurring in a great diversity of habitat. It is not surprising therefore that we find among them

considerable variation in the form of peristome, adapted to the differences of environment encountered by the numerous species.

What may perhaps be regarded as the typical form is that characteristic of the order Bryaceae, which we find exemplified in such well-known genera as *Bryum*, *Webera*, *Mnium*, etc. These mosses are for the most part typically found on rocks and walls, on the ground, in bogs and marshes, etc. A few, and these the commonest and most widely distributed, are also occasionally met with on the bark of trees, where however their occurrence is perhaps exceptional. In most of these plants the position of the capsule when ripe is vertically pendulous—the mouth being directed downwards. The spores are therefore dropped in little clouds, their escape being regulated by the movements of the peristome teeth in response to variations in the moisture of the air, so that in rainy weather, when the conditions are more or less unfavourable for the wide dissemination of such spores they are held back by the closing of the teeth; whereas in conditions of dry, breezy air they are discharged with some force to be carried by air-currents.

In the larger pleurocarpous forms this action, as we have previously remarked, is very effective in promoting the wide dispersal of the spores, and is greatly assisted by the “cervuous” form of capsule, the orifice being directed to one side so that the discharge of the spores resembles the firing of a pistol. In the case of our most widely distributed species of pleurocarpous mosses, such for example as the very common *Hypnum cupressiforme* (fig. 3), it is easy to understand that this method of dispersal may have much to do with the great abundance of this moss and its appearance everywhere on rocks, stones, earth, tree-trunks, old walls etc.—in fact nearly everywhere.



We may contrast this with the conditions obtaining in the case of the species of the genus *Orthotrichum*, a group of mosses specially characteristic of the trunks of trees. The forms of peristome found in the plants of this genus show considerable variety and are instructive as exhibiting the possibilities of such variation and the adaptation of this organ to its special function. The species of the genus are not all tree-loving: a few are found habitually on rocks; and it is worth while noting that the peristome differs in these species with the difference of habitat. In the rock-loving kinds the outer peristome teeth when dry either rise erect or are spread out at a wide angle, while the inner teeth are small and often imperfect. In one common variety the inner peristome is in fact usually wanting, although the peristome is typically double in this genus. In the case of the tree-loving species, however, the behaviour of the outer row of teeth is remarkably different. In dull or rainy weather the teeth curve closely inwards over the mouth of the capsule so as effectually to prevent the spores from escaping. It is easy to see the advantage of this; for otherwise the spores would be most likely to be caught by drops of rain, and so carried to the earth where they would be finally useless for purposes of germination. The discharge of the spores in any large numbers into the air as occurs in *Hypnum* would, in the case of the arboreal mosses, be almost equally useless; for the chances of their finding a resting-place on a tree-trunk with suitable conditions would be very remote indeed. The form of peristome usually in that genus would therefore in this case be a decided disadvantage. Instead of this then we have in these plants a very curious modification. When the air is dry the very sensitive outer peristome teeth become either completely reflexed, so as to be pressed against the outer wall of the capsule throughout their whole length

(fig. 4), or they are "revolute"—that is, bent outwards so as to touch the capsule wall by their tips. Both these forms occur in the genus; in both cases the effect is to remove the outer teeth out of the way, while at the same time the more rigid inner teeth remain erect or even curved slightly inwards. These teeth in this genus are somewhat slender, distant, and short. They serve very effectually to hold the escaping spores lightly in a little mass at the mouth of the capsule so that they may drop off in small numbers, becoming entangled among the leaves of the same or other moss plants, or the fronds of encrusting lichens, and so stand a good chance of germinating on a suitable sub-stratum. It is also a possibility that insects and other small animals which are often abundant upon the trunks of trees may play a part in the dissemination of such spores.

That this last possibility is at least not an altogether fanciful proposition gets some confirmation from the fact that there are some cases in which the dissemination of moss spores by insect agency seems to be established. There is a rather remarkable group of mosses which affect the unusual habitat of animal excretions and decaying organic refuse. On the droppings of cattle, of sheep, and of deer, there are species of the genus *Splachnum* which show some curious modifications of structure. These plants have a very remarkable development of the sporogonium just below the capsule. This takes the form of a very large swelling called the "apophysis", and differs in form in the different species of the genus (fig. 8B). It is in fact a kind of exaggeration of an organ more or less developed in many mosses which, however, in the great majority of cases is merely a small enlargement of the tissues immediately below the capsule proper and is usually seen as a kind of neck tapering into the seta. Its function in general is as an assimilating tissue

during the period of development of the spores. Not only is this swelling greatly extended in the genus *Splachnum*, being in most cases much larger than the capsule itself, but it is generally distinctively coloured. In one of our native forms, which is not infrequent upon cattle droppings, the apophysis is a brilliant orange and of a pear-shaped form, with the tiny dark-coloured capsule seated upon it like a small knob; in another, which occurs on sheep-droppings, the apophysis is a shining black and of a globular or slightly oval form (fig. 8B). In a species not known as yet in this country, but abundant in some parts of Norway, the apophysis spreads out like an umbrella, and is of a bright pale yellow colour and very large size, so that the moss in the fertile condition resembles a flower. It has been observed that various insects, dung-flies and the like, seem attracted by this display, and have been seen to remove the spores from the orifice of the ripe capsules by means of their proboscides. The form of the peristome in these mosses seems peculiarly adapted to facilitate such a method of spore distribution. Although normally of the "double" type, the inner row of teeth is either rudimentary or abortive, and the spores are held at the apex of the erect capsule by the protruding end of the "columella" which in this case remains persistent as a curious pin-shaped structure in the centre of the capsule (fig. 8B).

There are other very beautiful modifications of the peristome which we need only mention, as exemplifying the extraordinary variety to be met with in the different groups of mosses. Allied to the well-known "apple-moss" (*Bartramia*) is a curious plant found on the mountains in Scotland which shows one of the most elegant forms of peristome. In this species (*Conostomum boreale*) the beautiful crimson teeth are united by their tips, forming a crown-like structure which allows the escape of the spores through the



gaps between the teeth as the latter bend in their lower part in response to the variations of moisture (fig. 9).

Then there is perhaps the most striking case of all, the very remarkable lattice-work formed by the inner peristome of that curious aquatic moss *Fontinalis*. This plant forms great masses in running water and is very abundant in rivers and streams all over the country. The capsules are rare, however, the plants being usually barren, and reproducing themselves by means of the separation of branches which are copiously produced. When, owing to a period of drought the plants become stranded, however, and in danger of drying up, capsules may be developed and in that case they are generally to be got in some abundance. If the plants be examined in this condition just as the operculum falls, the appearance of the very large peristome structure is an object of exceptional attractiveness. In this case the spores appear to escape through the interstices of the very beautiful lattice-work of the inner peristome (fig. 10), and so may become scattered on the bed of the stream, with a chance of germinating while the current is not too strong. When the plant becomes submerged, and there is a danger that the spores may be carried away and lost the outer peristome teeth straighten themselves out and cover the inner structure, thus lessening the risk.

So far we have been considering the various forms assumed by the peristome which arises in all cases when the teeth, whether in a single or double row, consist merely of the remains of part of the walls of a single layer left when the unthickened parts of the tissues have broken down. The variety of such forms is astonishingly great and, as we have seen, it can be related directly in many if not most cases to peculiarities in the conditions arising from the special habitat of the plants. Such adaptations are plainly connected

with the physiological needs of the species, and must be regarded as modifications which have arisen secondarily—all being traceable back to some common ancestral form in which the peristome originated as a special organ formed from this particular cell-layer.

That the two forms—the “single” and the “double”—should be regarded as divergent lines of descent seems fairly obvious; and in this connection it is interesting to note that there is an order of mosses which appears to stand as a link between the two series. This is the order Encalyptaceae—consisting of the rather remarkable genus *Encalypta*, represented in our flora by five species, in which the peristome is sometimes single and sometimes double, and in some cases rudimentary or suppressed. All three states are represented in the British species—two have the single peristome, one has a double one, one of the others is quite without peristome, and the remaining species has a rudimentary one. The genus is in many ways diverse from other mosses, and may possibly be representative of some more primitive form.

But although the forms of peristome we have been considering characterise the great majority of moss species, there is another group in which this organ is constructed in a different way. Some mosses—and amongst them the most highly organised as far as their vegetative characters are concerned, as well as a few comparatively simple forms—have their peristome composed of more solid tissues, the teeth consisting of bundles of thickened cells. In its simplest form the “solid” peristome is made up of four triangular teeth, which result from the splitting—from an early stage in development—of the whole of the mass of cellular tissue within the upper part of the capsule (enclosed by the outermost layer which goes to form the operculum) into four

equal parts. This very simple-looking, and probably primitive, form of peristome occurs in the well-known moss *Tetraphis pellucida* (fig. 11), which grows abundantly on rotting stumps of trees and other decaying vegetable structures, although the moss is not very commonly found fertile.

The most familiar form of "solid" peristome, however, is that characteristic of the order Polytrichaceae, in which the moss-plant—the sexual generation—presents us with the most elaborately developed form of the "gametophyte" found in any group of plants. Here, the peristome consists of thirty-two or sixty-four solid teeth formed from contiguous pairs of cells whose walls become strongly thickened at an early stage after several divisions have taken place by which a cell-bundle becomes bent in horse-shoe fashion and makes up one half of each of two neighbouring teeth—the next bundle contributing the other half of the tooth. A space is thus left between the teeth through which the spores may escape. The teeth arch over a small area around the rim of the open capsule, the central part of the orifice of which is closed by a plate of tissue formed from the upper end of the columella. This plate is called the "epiphragm" and is firmly united to the tips of the peristome teeth. The spores can thus only escape through the spaces between the teeth, in "pepper-box" fashion (fig. 12).

This form of peristome has a quite different appearance from that of the usual one; and is of itself a sufficiently distinct character to distinguish the plants belonging to this group—the well-known genera *Polytrichum*, *Catharinea*, and *Oligotrichum*.

We have only touched upon the most outstanding points in a subject which opens out into a field for observation and research full of intense interest; and one which, although



it has received the attention of a number of very eminent bryologists, is still far from being fully investigated. But perhaps enough has been said to indicate the attractiveness of the study of the peristome to all who care to pry into some of Nature's curious "side-lines".

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#### EXPLANATION OF FIGURES.

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- Fig. 1.—*Bryum capillare*.—*a* Plant with immature capsule.  
*b* Capsule ripe, with peristome exposed.
- Fig. 2.—Single peristome of *Fissidens bryoides*.
- Fig. 3.—Capsule with double peristome of *Hypnum cupressiforme*.
- Fig. 4.—Double peristome of *Orthotrichum stramineum*.
- Fig. 5.—Longitudinal section of part of capsule of *Brachythecium*.  
*a* Columella. *b* Spore mother-cells. *c* Air-space. *d* Epidermis. *e* Peristome layer.
- Fig. 6.—Transverse section of the same at a point near the top of fig. 5. (Lettering similar).
- Fig. 7.—Inner peristome of (A) *Bryum*, with appendiculate cilia; and (B) *Webera*, without cilia.
- Fig. 8.—A. Peristome of *Tortula subulata*. B. Apophysis and capsule (showing peristome and remains of columella) of *Splachnum sphaericum*.
- Fig. 9.—Capsule and peristome of *Conostomum boreale*.
- Fig. 10.—Double peristome of *Fontinalis antipyretica*.
- Fig. 11.—Capsule and peristome of *Tetraphis pellucida*.
- Fig. 12.—Peristome and diaphragm of *Polytrichum*.

## LEE—"The Structure of the Peristome"

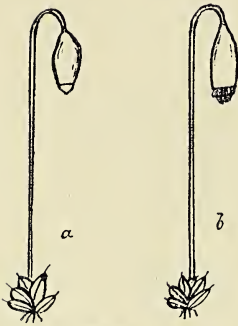


Fig. 1.

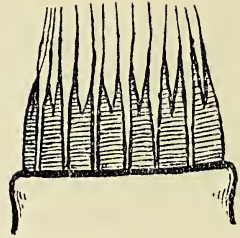


Fig. 2



Fig. 3.

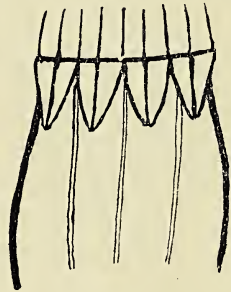


Fig. 4

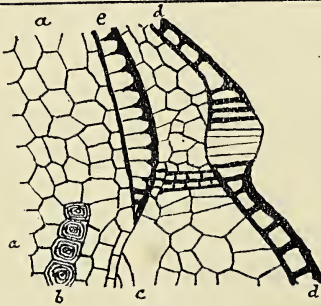


Fig. 5.

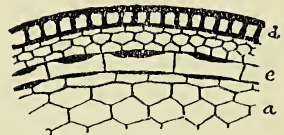


Fig. 6.

## LEE—"The Structure of the Peristome"

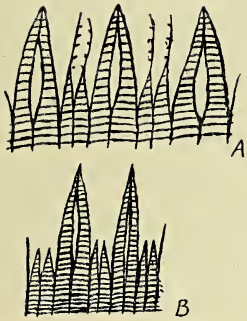


Fig. 7.

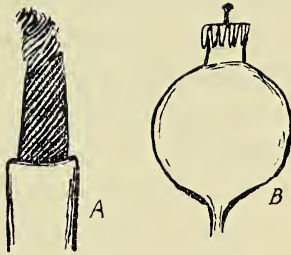


Fig. 8.

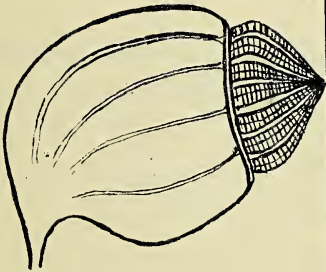


Fig. 9.

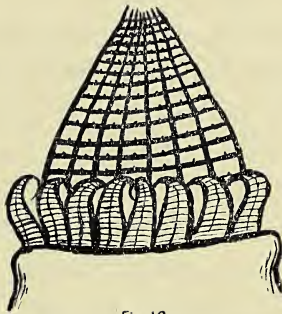


Fig. 10.



Fig. 11.

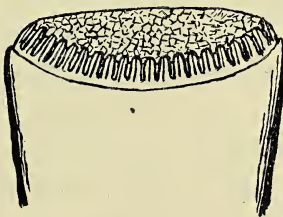


Fig. 12.

## BIRDS OF THE DARVEL DISTRICT.

By NICOL HOPKINS.

[Read 12th June, 1940.]

The area comprises the upper reaches of the River Irvine. South of Newmilns and Darvel, the Loudon and Lanfine Estates contain some good agricultural land and fine stretches of woodland. The higher ground is mostly moorland. Some of the tributaries pass through rugged country before reaching the river. There are no lochs of note in the area.

*Raven*, Heard near Darvel, spring, 1917. (fide Gavin Alston)

*Hooded Crow*, Very rare. Many years ago, nested in wood on Lanarkshire bank of River Irvine.

*Carrion Crow*, Fairly well distributed. Nests early *e.g.*, 11th April (5 eggs).

*Rook*, In 1937 an overflow took place from Waterhaughs Rookery to Lanfine policies. Some small rookeries abandoned in recent years.

*Jackdaw*, Rapidly on increase. 1938, record year for numbers.

*Maggie*, Nests in fair numbers.

*Jay*, No recent record. Lecturing to Glasgow Natural History Society, on 27th December, 1887, David Landsborough said, "About 70 years ago the Jay was not uncommon in the Loudon and neighbouring woods, but was almost extirpated".

*Starling*, Abundant at all seasons.

*Greenfinch*, Abundant. Nests early April till early September. Latest recorded, 12th September, 1923. Large flocks frequently seen in winter.

*Goldfinch*, Has increased within the last 20 years.

*Siskin*, Becoming more numerous. On one occasion this year 50 were observed together.

*Twite*, Fairly common 30 years ago. Have seen about 2,000, settled in a large field in which Benweed (*Senecio Jacobaea*, L.) grew profusely. Seldom met with in recent years though frequent in 1938.

*Mead Redpoll*, Rather rare. First recorded by me 5/2/1908, feeding in company of a dozen Lesser Redpolls and one Goldfinch. Great influx during autumn, 1910.

*Lesser Redpoll*, Formerly decreasing steadily; recent reports shew increases. Fully 30 years ago I found 12 nests with eggs, mostly built on Crab Apple trees at no great height and all within a short distance of each other.

*Linnet*, Fairly frequent, even quite close to Darvel. Nested.

*Bullfinch*, Nests sparingly in the district. During the winter, small companies up to a dozen birds are frequently observed.

*Common Crossbill*, My brother Andrew, on 3/5/1912, located a pair of Crossbills in a small Fir wood about a mile east of Darvel. I confirmed this later in the day. They remained for a few days. Gavin Alston noted some near Darvel in 1927 and thought they were the Two Barred Crossbills as the note was softer.

*Chaffinch*, Plentiful at all seasons. Cream coloured specimen observed, winter 1908.

*Brambling*, October till April, small parties frequently met with either by themselves or in company with Chaffinches. Enormous flocks observed 6/4/1908 and another, near same place, 10/4/1909. On both occasions they were very restless and made a great noise.

*House Sparrow*, Abundant at all seasons.

*Corn Bunting*, 30 years ago, nested sparingly near Darvel, now seldom met with, except on lower lying ground near Galston.

*Yellow Bunting*, Fairly common at all seasons.



*Little Bunting*, Company of six observed 19/1/1908.

*Reed Bunting*, Fairly common. Usually found in company with Yellow Buntings and various other birds of the Finch tribe.

*Snow Bunting*, Gavin Alston informed that he used to see enormous flocks pass over during migration. Small parties and stray individuals are all that have been seen for a number of years.

*Skylark*, Common during summer. Depart from upland district towards end of October. By end of January or beginning of February they reappear at their nesting places.

*Tree Pipit*, Generally arrives about 24th April. Early date, 13th April. Have found a Cuckoo's egg in several nests of this bird.

*Meadow Pipit*, Very common nesting species. A few remain as long as the winter keeps open. There is no other bird so victimised by the Cuckoo as the little Moss Cheeper.

*Blue Headed Wagtail*, Under observation at Darvel 15 till 19/6/1920.

*Yellow Wagtail*, Generally arrives towards end of April and departs towards end of September. Nests May, mostly among growing hay or corn. Eggs frequently six.

*Grey Wagtail*, Distributed generally along stream sides. Nests early. Have found nest containing eggs very early in April.

*Pied Wagtail*, Though termed a resident there is quite a movement of these birds in autumn and, if the winter is severe, they may entirely disappear. During autumn I have often watched them trooping in in small companies to some favourite roosting places. During March small flocks are often seen as they pass outwards to more northern nesting places.

*White Wagtail*, Only known as a spring migrant; none, so far as I know, remaining to nest.

*Tree Creeper*, Thinly scattered throughout wooded district. Song commences in February; nests with eggs found early in May. Like the Long-Tailed Tit and Goldcrest its numbers are greatly reduced in severe winters.

*Great Tit*, Common at all seasons. Clutch usually 6-8. Have seen 12.

*Blue Tit*, Most numerous of the Tit family.

*Coal Tit*, Fairly common nesting species, more numerous during cold months.

*Willow Tit*, Though I have never found the Willow Tit's nest I have several times watched the young being fed by the parents just after leaving the nest. Around Darvel it is by no means common.

*Long-Tailed Tit*, Nests rather sparingly.

*Goldcrest*, Fairly well distributed in our woodland districts. Egg-laying commences end of April or early May. Two broods frequent.

*Great Grey Shrike*, Has occurred twice near Darvel.

*Waxwing*, A small party observed, spring 1937.

*Spotted Flycatcher*, Arrives about 12th May; leaves early in September. On 9th May, 1915, I saw about 30 scattered over a small ploughed field bordering the banks of the Lindsay Burn.

*Pied Flycatcher*, I heard the song of this bird and saw it on 16/5/1920—the only record I know of it near Darvel.

*Chiffchaff*, Very sparingly distributed. About two pairs are the limit during the nesting season.

*Willow Warbler*, By far the most numerous of the Warblers. Arrives about 14th April and departs towards end of September.

*Wood Warbler*, Two weeks later in arriving than the last named and departs much earlier. Not so well distributed as

last; mostly confined to Beech, Oak and occasionally Fir woods.

*Grasshopper Warbler*, Very sparingly distributed. Arrives early in May.

*Sedge Warbler*, Arrives about 3rd May, departs end of September. My latest record 20/10/1910—side of River Irvine. Two broods frequently reared.

*Garden Warbler*, Arrives during second week in May, departs first half of August—one brood.

*Blackcap Warbler*, Rather rare. Arrives in early May. Possibly two broods.

*Whitethroat*, Beginning of May till early September. Two broods. Stragglers may be seen towards end of September.

*Lesser Whitethroat*, Pair observed near Galston, beginning of June, 1906.

*Fieldfare*, End of October till early May. Late stragglers seen 19/5/17.

*Mistle Thrush*, Fairly common at all seasons.

*Song Thrush*, Numerous at all seasons. Have seen eggs in nest as early as 8th March.

*Redwing*, Not so numerous as Fieldfare. First half October till early April.

*Ring Ousel*, A pair or two nest along some of our moorland streams.

*Blackbird*, Common.

*Wheatear*, End of March till early October.

*Greenland Wheatear*, Passing migrant in spring and in October. On 5/5/1918 watched five alight on a tall hawthorn hedge.

*Whinchat*, Common. Arrives end of April or early May; departs early September. One observed 27/9/1926.

*Stonechat*, Rarely seen. Know of its nesting once in the district.

*Redstart*, Fairly frequently seen early May and August-September.

*Redbreast*, Common at all seasons.

*Hedge Sparrow*, Not very numerous.

*Wren*, Common at all seasons.

*Dipper*, Common. Have watched it carrying nesting material before end of February.

*Swallow*, Arrives about mid-April. During summer of 1918 a pair reared three broods of six.

*House Martin*, Not nearly so numerous as the swallow. Arrives rather later. Have seen this bird feeding young in the nest as late as 1st October.

*Sand Martin*, Mid-April till mid-September.

*Swift*, Not common; nests at Galston.

*Nightjar*, Very rare. Nest found in 1913.

*Kingfisher*, By no means common.

*Great Spotted Woodpecker*, Has nested in recent years in Lanfine Woods.

*Cuckoo*, Fairly well distributed. Arrives about last week in April. Have found its eggs in the nests of Meadow Pipit, Tree Pipit, Reed Bunting, Chaffinch and Willow Warbler.

*Long Eared Owl*, Well distributed. Once found nest with eggs, 15th March.

*Short Eared Owl*, Known as a winter visitor. Small numbers.

*Tawny Owl*, More numerous than Long Eared Owl. Nests early.

*Barn Owl*, A decided increase in last few years.

*Hobby*, Young bird shot in August, 1915.

*Merlin*, Thinly scattered over moorlands.

*Kestrel*, Fairly common.

*Common Buzzard*, Have seen it twice near Darvel.



*Hen Harrier*, A male bird was brought me from Loudon Estate, 23/4/1917.

*Sparrow Hawk*, A few pairs nest annually. Never allowed to become common.

*Peregrine Falcon*, Recorded once—"at Cronan, on Loudoun Estate." ("Birds of Hareshawmuir")

*Kite*, A bird bought at Loudon Castle in 1923 by Gavin Alston was believed to have been secured in Loudon Estate.

*Common Heron*, Fairly frequent. Not known to nest.

*Mute Swan*, Now nests near Galston.

*Grey Goose*, Small flocks frequently fly over during winter.

*Snow Goose*, One observed near Darvel, 28/4/1906.

*Mallard*, Nests, but never numerous owing to lack of natural habitat.

*Teal*, Quite a few nest—but never numerous.

*Widgeon*, Heard it call at night, end of October, 1920.

*Tufted Duck*, A few pairs frequent Burnbank Marsh, near Galston.

*Storm Petrel*, A number of years ago Mr. Paterson, game-keeper, on Windshield Moor, picked up one in an exhausted condition.

*Manx Shearwater*, One was shot on Lanfine Estate on 20/9/1912.

*Great Crested Grebe*, About six years ago one was seen on duckpond of Crofthead Farm.

*Little Grebe*, Nests near Galston. Occasionally seen in River Irvine near Newmilns.

*Wood Pigeon*, Common.

*Stock Dove*, Mostly absent during winter. Returns February. Lays in March—earliest record, 17th.

*Oyster Catcher*, Rarely comes as far as Darvel.

*Golden Plover*, Nests in fair numbers on the moorlands.

Very large flocks sometimes noted in late autumn and again in May.

*Grey Plover*, Heard a pair calling as they flew over on 30/9/1917.

*Lapwing*, Marked increase in past few years.

*Dunlin*, Very sparingly distributed on moors at nesting season.

*Common Sandpiper*, First half April till end of August or early September.

*Green Sandpiper*, One seen on River Irvine, 6 to 10/8/1919.

*Common Redshank*, Common. Usually absent in winter.

*Greenshank*, Have heard its cry during autumn. (On migration).

*Curlew*, Common. Rare in winter.

*Whimbrel*, Heard early on 20/8/1913. (On migration).

*Great Snipe*, Has occurred two or three times near Darvel.

*Common Snipe*, Common.

*Jack Snipe*, Only in winter. Not so numerous as last.

*Woodcock*, Fairly common. Two broods frequently.

*Common Tern*, Years ago one was shot on the River Irvine.

*Black Headed Gull*, Nests abundantly on some moorlands.

*Common Gull*, Less common than Herring and Lesser Black Backed Gulls.

*Herring Gull*, Common, immature birds predominating.

*Lesser Black Backed Gull*, Only in summer. I saw one on 5/1/1919 which probably belonged to the northern race.

*Great Black Backed Gull*, Winter months. An odd one or two.

*Landrail*, 21st April till autumn. Two winter records.

*Water Rail*, Twice recorded in winter, once in summer.

*Moorhen*, Common.

*Coot*, Nests at Burnbank Swamp, near Galston.

*Black Grouse*, Not so common as next.

*Red Grouse*, Common on all heaths.

*Pheasant*, Common at all seasons.

*Common Partridge*, Pairs off early in February. Egg-laying not before end of April. Old and young remain together till following February.

In all 131 species and, of these, 88 have been known to nest in the area.



# **RETURN OF SUMMER BIRDS TO THE CLYDE AREA IN 1938 AND 1939.**

Compiled by THOMAS ROBERTSON.

**1938.**

|       |     |                          |                        |
|-------|-----|--------------------------|------------------------|
| March | 7,  | Lesser Black-backed Gull | Albert Bridge, Glasgow |
| „     | 29, | White Wagtail            | Milngavie              |
| April | 2,  | Common Sandpiper         | Brodick                |
| „     | 7,  | Chiffchaff               | Dalry                  |
| „     | 8,  | Wheatear                 | Torrance               |
| „     | 10, | Swallow                  | Dalry                  |
| „     | 15, | Sand Martin              | Symington              |
| „     | 15, | Willow Wren              | Kilehatten Bay, Bute   |
| „     | 28, | Cuckoo                   | Kilmacolm              |
| May   | 1,  | Yellow Wagtail           | Dalry                  |
| „     | 3,  | Common Whitethroat       | Milngavie              |
| „     | 3,  | Sedge Warbler            | Strathblane            |
| „     | 4,  | Corncrake                | Summerston             |
| „     | 5,  | Tree Pipit               | Darvel                 |
| „     | 7,  | House Martin             | Scotstoun              |
| „     | 7,  | Wood Wren                | Darvel                 |
| „     | 7,  | Whinchat                 | Darvel and Dunure      |
| „     | 11, | Swift                    | Possil Marsh           |
| „     | 12, | Spotted Flycatcher       | Possil Marsh           |
| „     | 13, | Garden Warbler           | Darvel                 |
| „     | 14, | Common Tern              | Possil Marsh           |
| „     | 15, | Redstart                 | Kilmacolm              |
| „     | 17, | Grasshopper Warbler      | Darvel                 |

Of the above 23 species, 21 were also noted last year, and in comparison 2 were earlier this year, 2 on the same date and 17 later. Taking the average dates over a period of 25 years, this year 3 were earlier, 2 on the same date and 18 were later than their average.



## 1939.

|           |                          |                             |
|-----------|--------------------------|-----------------------------|
| Feb., 10, | Lesser Black-backed Gull | Largs                       |
| March 31, | Wheatear                 | Dalry                       |
| April 6,  | Sand Martin              | Motherwell                  |
| „ 7,      | Swallow                  | Pollok Golf Course, Glasgow |
| „ 11,     | Willow Wren              | Bute and Dalry              |
| „ 16,     | White Wagtail            | Largs                       |
| „ 16,     | Chiffchaff               | Pollok Park and Dalry       |
| „ 16,     | Cuckoo                   | Gourock                     |
| „ 17,     | Common Sandpiper         | Dalry                       |
| „ 18,     | Yellow Wagtail           | Motherwell                  |
| „ 18,     | Tree Pipit               | Motherwell                  |
| „ 20,     | House Martin             | Dalry                       |
| „ 29,     | Corncrake                | Kilmacolm                   |
| „ 30,     | Common Whitethroat       | Irvine                      |
| May 4,    | Sedge Warbler            | Lochwood, Coatbridge        |
| „ 6,      | Whinchat                 | Milliken Park               |
| „ 6,      | Garden Warbler           | Darvel                      |
| „ 7,      | Wood Wren                | Darvel                      |
| „ 8,      | Common Tern              | Motherwell                  |
| „ 16,     | Swift                    | Kilmacolm                   |
| „ 24,     | Spotted Flycatcher       | Lambhill                    |

In comparison with last year, 14 were earlier, 1 was on the same date and 6 were later in arriving. Taking the average arrivals over a period of 25 years, 11 were earlier and 10 later than their averages.

## DIGEST OF THE PROCEEDINGS OF THE SOCIETY.

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11TH JANUARY, 1938.

The first meeting of the Eighth Session was held, the President, Mr. Wm. Russell in the chair. Sederunt 50.

An exhibition of lantern slides was given by members of the Photographic Section, the subjects being:—

Insect Studies by Prof. L. A. L. King and Miss A. A. Meikle, B.Sc.

Colour Slides of Fungi by the late Mr. W. R. Baxter, per Mr. R. H. Johnstone, M.A.

General, by Messrs. T. D. Scott, Wm. Smith, Jas. Kirkwood and Jas. R. Wood, C.A.

The following new members were admitted:—Mr. John Boyes, B.Sc., Morven, Eaglesham; Mr. Wm. C. Sword, M.A., 18, Eastcote Avenue, Jordanhill; Mr. Wm. Smith, c/o Alexander, 80, Colinslee Drive, Paisley.

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8TH FEBRUARY, 1938.

The Annual Business Meeting of the Society was held, Mr. Wm. Russell presiding.

The reports of the Society's activities were read and approved. The following new office-bearers were elected:—Vice-President, Mr. E. J. A. Stewart, M.A., B.Sc. Members of Council, Mrs. Mary Glen, M.A., Dr. Blodwyn Lloyd, M.Sc., Messrs. John R. Lee and John G. Connell, F.R.M.S. Ornithological Section Convener, Mr. T. Robertson. Mr. Lee was appointed delegate to the British Association to succeed Mrs. Ewing, resigned.

8TH MARCH, 1938.

Dr. Blodwyn Lloyd, M.Sc., read a paper on "Inheritance in Plants", which was illustrated by lantern slides and specimens.

Mr. James Jack exhibited nests of the Norwegian Wasp, taken from Gooseberry bushes at Luggiebank, Cumbernauld; and Prof. King exhibited an early nest of the Ground Wasp.

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21ST APRIL, 1938.

Dr. W. J. M'Callien lectured on "Scotland's Gems". The lecture was illustrated by cut and uncut specimens. Cut and polished specimens from the collection of Messrs. Jas. K. Philp and James B. Hepburn were shown.

The following were admitted to membership:— Mr. Geo. Maclean, 70, Hermitage Avenue, Knightswood; Mr. Jas. P. Lothian, 59, Palmer Avenue, Knightswood; Mr. and Mrs. David W. Mackie, 178, West Princes Street.

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12TH MAY, 1938.

This meeting was devoted to the exhibit of the works and methods of the various sections of the Society.

The following new members were admitted:—Mr. Fred. Russell, 1, Argyll Arcade; Mr. Robert Aird, 203, Southbrae Drive.

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9TH JUNE, 1938.

Mr. Thomas Robertson submitted a list of the first arrivals of Summer Birds in the Clyde Area in 1938, compiled from reports of members and friends. (v. page 33).

Mr. Geo. A. Emery gave a talk entitled "Something about Birds".

Mr. Wm. Rennie recorded the occurrence of a pair of Black-tailed Godwits (*Limosa limosa limosa*, Linn.) in summer plumage on 11th and 12th May, 1938 at Possil Marsh. This is an addition to the birds of Possil Marsh and is only the fifth recorded locality for the occurrence of the bird in the Glasgow district within a radius of ten miles.

Mr. John R. Lee read the report by Mr. Alex. Ross, F.E.I.S., the Society's delegate to the 150th Anniversary Meeting of the Linnean Society, held in London on 24th to 27th May, 1938.

The following new members were admitted:—Dr. James Dunlop, M.A., M.B., Ch.B., 60, Culrain Street, Shettleston; Mr. John Aitken Macnair, F.I.C., 39, Monksbridge Avenue, W.3.; Mr. John W. Morton, 26, Gateside Street, Hamilton; Mr. Adam Welsh, Govan Secondary School, Langlands Road.

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#### 20TH SEPTEMBER, 1938.

Mr. John R. Lee exhibited a specimen of *Impatiens Noli-me-tangere*, L. from Balloch Park.

Specimens from various parts of the British Isles were shewn by Messrs. John R. Lee, Wm. Rennie, George Lunam, Robert H. Johnstone, M.A., and Prof. Braid (Botanical); Messrs. Wm. Russell, James C. Graham, and Prof. L. A. L. King (Ornithological); and Mr. Wm. M'Lean (Geological).

An invitation to members to attend the annual conversation of the Quekett Microscopical Club was intimated and it was agreed to ask Mr. Alex. Ross, F.E.I.S., to represent the Society and Messrs. Woodger, Buchanan and Thomson to send exhibits.



11TH OCTOBER, 1938.

Mr. John R. Lee exhibited the Hornwort (*Ceratophyllum demersum*, L.) found by Mr. Wm. Rennie at Firhill timber pond, a species new to the Clyde Area; also, *Potamogeton obtusifolius*, M. & K., from Lanark.

Prof. L. A. L. King read a paper on "Naturalists in Germany".

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8TH NOVEMBER, 1938.

Mr. J. C. Graham exhibited seaweed from the Sargasso Sea. Miss Meikle shewed *Cosmia trapizina*, L., the caterpillar of which was taken on Oak at Loch Riddon on 23rd May, pupated on 23rd June and emerged on 25th July.

Mr. John M'Crindle, J.P., F.R.Z.S., gave a talk on "A Bird-nesting Trip to Ireland".

Mr. Wm. John Cannon, 339, Lincoln Avenue, was admitted a member.

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13TH DECEMBER, 1938.

Mr. H. D. Slack, Ph.D., delivered the Goodfellow Lecture, his subject being "Trout Fisheries"—a brief account of personal experience on problems affecting trout streams, particularly rivers in Hampshire.

Miss Phyllis Woodland, 112, Maxwellton Road, East Kilbride, was admitted to membership.

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10TH JANUARY, 1939.

The first meeting of the Ninth Session was held, Mr. Wm. Russell, President, in the chair; 50 members and friends being present.

The Photographic Section gave its annual exhibition of lantern slides and films, the contributors being:—

Prof. L. A. L. King,—Animal Studies; Mr. David Anderson and Mr. Cree,—Landscapes; Mr. Wm. Burns,—Birds and Snow Scenes; Mr. John Sawers shewed cine-films in colour of Flowers, Goldfish and Kingfishers. Mr. Wm. Pettigrew exhibited films of Scenery taken on a journey from Balloch to Kinlochleven.

The following new members were admitted:—Mr. and Mrs. James S. Nicol, 30, Harelaw Avenue, S.4.

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#### 14TH FEBRUARY, 1939.

The Annual Business Meeting of the Society was held, Mr. Russell presiding.

The usual Reports were submitted and approved and the following new office-bearers were appointed:—Vice-President, Mr. James Jack. Librarians, Messrs. James C. Graham and Robert Hodge. Members of Council, Messrs. Richard Prasher, Geo. Maclean, Geo. Lunam and Dr. Patton.

Mr. Douglas Grant, 75, Curtis Avenue, S.4., was admitted a member.

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#### 14TH MARCH, 1939.

Mr. Norman W. Radforth, M.A., read a paper on "The Flowering Plants and Environmental Variations in the Muskoka Lakes Region of Canada".

The following new members were admitted:—Mr. Chas. M'Neil, 73, Drumbottie Road, N.; Mr. Robt. Gray, c/o. Ballantine, 23, Dunearn Street, C.4; Mr. Chas. Florence, 18, Penrith Drive, W.2.

24TH APRIL, 1939.

Mr. Richard Elmhirst, F.L.S., reviewed an early paper on "*Patella*" by Dr. Robertson of Millport; and Prof. K. W. Braid exhibited a Callus Growth on the stem of a Pine from Williamwood.

The following new members were admitted:—Miss Headley, 6, Stamperland Drive, Clarkston; Miss Eva Dunlop, B.Sc., 1, Bolivar Terrace, S.2.; Miss Helen M. G. Ruff, Abercorn School, Paisley; Mr. Edward J. Forbes, M.A., 9, Agnes Avenue, Coatbridge.

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15TH MAY, 1939.

This meeting was devoted to Exhibits from the various Sections.

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12TH JUNE, 1939.

It was agreed to send congratulations to Professor J. Graham Kerr on his receiving the honour of knighthood.

Mr. Thos. Robertson submitted a list of the first arrivals of Summer Birds in the Clyde Area in 1939. (v. page 34).

Mr. Geo. Maclean read a paper on "Simple Photo-Micrography as an Aid to Nature Study".

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11TH NOVEMBER, 1939.

Miss Sheina Marshall, D.Sc., read a paper on "The Herring and its Fishery". Special reference was made to the work done at the Marine Biological Station, Millport.

Mr. Alex. M. Reid, B.Sc., Dunnpark, Bargeddie, Lanarkshire, was admitted to membership.

9TH DECEMBER, 1939.

Mr. John R. Lee delivered the Goodfellow Lecture on "The Structure of the Peristome". (v. page 1).

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### NOTE FROM EXCURSION REPORTS.

On the Whangie Excursion Mr. John R. Lee reports:—  
Amongst the small hepatics I found growing in crevices of the rocks was a form of *Ptilidium pulcherrimum*, (Web.) Hampe,—a small green form closely resembling the one described by Macvicar (The Student's Handbook of British Hepatics) in the last paragraph of the notes on that plant. I have not previously met with this form, having gathered only the usual one which habitually grows on trees. It seems also to be a **new record** for v.c.86 although I had previously collected the tree form in that area. 6/5/1939.



## IN MEMORIAM.

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### **Mr. Robert Garry, B.Sc.**

Mr. Robert Garry was a science graduate of Edinburgh University. He also studied science at the Royal College of Science, South Kensington. He came to Glasgow to join the science staff of the school that now is Glasgow High School for Girls and remained in the same school, head of the science staff, until he retired.

For the greater part of the time he was in Glasgow he was a member of the Microscopical Society of Glasgow, of the Natural History Society of Glasgow and of the Andersonian Naturalists' Society. He was a member of the present society up to the time of his death on 21st January, 1938. He was for a term Vice-President of the Natural History Society, was Vice-President of the Andersonian Naturalists' Society in 1905 and 1906, and President in 1907 and 1908. He took an active part in the work of the Councils of the Societies, and also in several of the Sectional Committees, especially the Microscopical.

His special interest was Botany. He specialised in the Fresh-water Algae, but he was a good all-round naturalist. On September 28th, 1909, he read a paper (The Glasgow Naturalist, vol. II. part 1) on "Some Recent Additions to the Fresh-water Algae of the Clyde Area", before the Natural History Society. He was keenly interested in Microscopy and Photography, and did some very good work in Photo-micrography. He also took a good deal of interest in Ornithology and Zoology, and in his active days was a steady supporter of the excursions to the Marine Biological Station at Keppel, and of the field-work in general of the Societies.

R. M'L.

### Mr. John Robertson.

John Robertson was born in Edinburgh in 1871. His mother was then a widow, his father having died through an accident at his work a few months previously ; and so from his earliest years young Robertson was accustomed to a feeling of responsibility which largely moulded his character as a youth, giving him a certain forcefulness and independence which remained a feature of his later life. While he was yet an infant his mother removed to Glasgow, where his education was begun and completed. He left school and began work at the early age of thirteen. Thus, although by birth a native of the Capital, he may be fairly said to have been a Glasgow man. He served apprenticeship as a blacksmith with Messrs. P. & W. Maclellan, and was afterwards employed by them and later by Messrs. P. & R. Fleming. About the year 1903 he went out to the United States, where he worked at his trade in several different places, returning four years later to Glasgow. Afterwards he was for many years with Messrs. L. Sterne & Co., North Woodside Road, where he held the position of foreman blacksmith at the time of his death. He was recognised as a capable, trustworthy and conscientious workman, and earned the respect and esteem of his fellow-workers, and of the firm.

His interests were manifold and of an exceptionally high order. His principal hobby was books. He was familiar with most of the great English classical writers, and likewise kept abreast of the more intellectual modern authors. For the multifarious "trash" of current fiction he had a healthy contempt ; feeling that life was far too valuable to be thrown away. He also took a special interest in art and was fond of discussing critically the merits of various artists of eminence. With characteristic thoroughness he engaged in different

forms of social and religious work ; and he was an Elder in the congregation of North Woodside United Free Church.

Always a keen lover of nature, he was in early manhood an enthusiastic cyclist and spent much of his leisure in the country. About the time of the Great War he joined the Andersonian Naturalists' Society ; and he was wont to say that one of the keenest regrets of his life was that he had not known earlier of the existence of that happy company. In all the branches of nature study with which its members concerned themselves he took an enthusiastic interest ; although botany from the first claimed his more especial attention. Although having little previous knowledge of the science, he soon made remarkable progress in acquiring an extensive acquaintance with the native flora, and at the excursions of the society he was quickly recognised as a trustworthy guide. He became a member of the Natural History Society of Glasgow in 1927 and has held office in the council of both societies, and also in that of the present combined Society. At our outings he was a regular attender, and his well-known figure, his cheery voice, infectious humour and grateful companionship will be greatly missed. During the summer of 1937 he had not been well ; but he bravely and (as the sequel proved) somewhat foolishly and against doctor's orders stuck to his work until the New Year, when he became definitely laid aside. He passed away on Wednesday, 6th April, 1938 in his 67th year.

J.R.L.

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#### **Mr. Lawrence A. Watt.**

By the death, on 20th January, 1939, of Lawrence Alexander Watt in his 90th year there may be said to have passed from us the last member of that band of naturalists of the old

school who formed the stalwarts of a past generation. This Society, and those three constituent bodies from which it was formed by amalgamation in 1931, owed to them the vigorous life and enthusiasm by which was acquired that considerable body of information regarding the Natural History of the Clydesdale district which has been our special contribution to local knowledge. Particularly in the study of field botany, the early roll-books of these societies bear the names of many men whose labours contributed to provide the rich heritage of the students of to-day. Of those workers in the botanical world of last century it may with truth be said that intellectually there were giants in the earth in those days. One has only to mention a few of the names which have become classic in order to suggest their calibre—such names as Roger Henedy, Thomas King, Alexander Somerville, Johnstone Shearer, Richard Mackay, Robert Turner, Peter Ewing and Daniel A. Boyd. To this galaxy Lawrence Watt belonged; and having outlived them sufficiently to connect their generation in his own person with that new world of thought which the present century has called into being, and which has been made possible largely by such labours as theirs, he forms an interesting link between the great things of the past and those humbler efforts which alone remain possible to us in a similar field.

Mr. Watt was a native of Banff, and to the end of his long life he retained a great affection for that north-eastern corner of the country, although much the greater part of his days was spent on Clydeside. He was in the habit of taking part at least of his summer leisure in the north, and a number of the many communications he made to the Society's "Transactions" referred to observations during these holiday times. In social and business life his was a particularly attractive personality. To a vigorous and alert



mind he combined a peculiar charm of manner and a sincerity of spirit which rendered him a general favourite. For many years he was on the permanent staff of the famous ship-building yard of Messrs. John Brown, Limited of Clydebank, where he was greatly respected, and even after his retirement from active service, his was a well-known figure in and about the busy shipyard in the activities of which he continued to take a great interest. Nor was it only in the way of his daily tasks that he became known to his fellow-townsmen of Clydebank. His was that eager social nature that knows the urge to serve in all possible ways; and in everything calculated to enhance the well-being of the community in which his lot was cast he was always willing to spend and be spent, and to labour to the best of his abilities. He was among the first to take part in promoting the development of the co-operative movement in the town; and in all social and educational matters he was ever in the fore-front. The first public library opened in the burgh was under his charge as librarian, a post he held until modern developments made it necessary to hand over such work to younger men. He was an enthusiastic member of the Ancient Order of Shepherds, of which society he was a Past Master. In the civic affairs of the community he also took a keen interest; and on the occasion of the celebration of the burgh's Jubilee a few years ago he was one of the most active in the preparations for the event. In religious matters, too, he took an active part, being a worker as well as a sincere worshipper in the Union Church, of which he was a member.

His connection with the Natural History Society of Glasgow goes back to well over half a century; but prior to that he was already known as a botanical worker of distinction. In vol. IV of the Society's "Transactions" for the year 1889 his name appears as an "associate member" and

he seems to have been admitted shortly after that date to the status of full membership, for in the succeeding volume he is entered as an "ordinary" member. His contributions to the work of the Society were very numerous; exhibits of rare and interesting plants from various localities, and notes upon his own studies in the field were a frequent feature at the meetings, while many of the most important outings to places of botanical interest were under his care. His acquaintance with the native flora was both extensive and intimate, and his special knowledge of the more critical groups rendered him a reliable authority upon some of the formidable problems with which the student of field botany is often confronted. In this latter connection his genial personality made him a valuable "friend in need" to younger men, who found they could always approach him with confidence for help in a difficulty.

His botanical studies were by no means confined to any particular locality; but he was specially devoted to the study of the flora of Dumbartonshire, regarding which he was generally acknowledged to be the best informed authority. He undertook the floral survey of that area in connection with the preparation of the "Glasgow Catalogue" compiled by his close and intimate friend Peter Ewing; and a glance through the pages of that valuable work will reveal how thoroughly his part of it was carried out. To his keen powers of observation are due many of the records of the occurrence of rare species; and the completeness of the list for that vice-county (99) is a testimony to the care and thoroughness with which his work was always done. In his revision of Henney's "Clydesdale Flora" in 1890 Professor Thomas King was indebted for many of the additional facts therein recorded to the work of Mr. Watt, and his name appears repeatedly in the notes embodied in that revised edition.

He made extensive collections of plants from various localities, and exchanged specimens with other well-known collectors in different parts of the country, so that he came to be possessed of much valuable material for the prosecution of his studies. It is characteristic of the man that these collections were handed over, during his life-time, to the local academy in order that they might be available for the furtherance of that study which had been a source of so much pleasure and interest to himself.

For the past few years, owing to failing strength, Mr. Watt was unable to attend our meetings with any regularity, and ultimately he was constrained to tender his resignation as a member. But to the very last he retained his interest in our activities, and was pleased to hear of every token of success which attended our labours. He is gone—but his memory will long remain as one of the choice treasures of our history.

J.R.L.

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### **Mr. Alexander Ross, F.E.I.S.**

Alexander Ross, F.E.I.S., was born on 10th September, 1857, and spent his boyhood in the neighbourhood of Paisley Road Toll, Glasgow. To him the “Docks” were a happy hunting ground. “Alick” attended the Highland Society’s School in Montrose Street, and commenced his study of Physiology at the Secular School in Carlton Place. Later he proceeded to Glasgow University and to the Free Church Training College. He began his teaching career in Coltness in 1878 and, in that year, came to Glasgow where he served as an assistant in schools in the Maryhill district till 1894. That same year he was appointed headmaster of Eastpark

School and, in 1905, of Garrioch School. Eleven years later he was transferred to Thomson Street School and continued there as headmaster until he retired in 1922. On the death of his sister, who also was a member of our society, he removed to Enfield, Middlesex, and there on 3rd April, 1940, he ended his days.

Alex. Ross joined the Andersonian Naturalists' Society and the Natural History Society of Glasgow in 1894 and straightway went into harness. That year he was Joint Hon. Secretary of the Andersonians' which post he held for several years. His name occurs very frequently in the "Annals". In vol. II appeared his "Records of Excursions in Stirlingshire", and in vol. III "Records of Excursions in Argyllshire". He was a convener of the Entomological Section and a member of the Publications and Library Committee. In the Natural History Society, after serving on the Council, he became Joint Hon. Secretary in 1903, a post which he held for 18 years. He was President from 1920 till 1923, and Joint Editor of Transactions from 1926 until 1935.

Ross was an enthusiastic leader of excursions and his reports on these form valuable contributions to the Transactions. He was well-versed in all the Natural Sciences and an expert in Entomology and Ornithology. In the former his most extensive studies were in the realm of the Diptera. In the latter he was a reliable recorder of First Arrivals of Summer Birds. The Society published his "The Birds of Islay" in 1913, "Some Additional Notes on the Birds of Islay" in 1915, and "Summer Birds about Tarbert, Loch Fyne" in 1921.

It was Alexander Ross who wrote the Obituary Notices of George Guthrie, John Paterson, Dr. Thomas Gilmour, John Robertson, James J. F. X. King and Andrew Barclay.

He seconded a motion by Dr. Patton which led to the



preparation of the Card Catalogue of the Fauna and Flora of the Clyde Area, for the visit of the British Association to Glasgow in 1928. His was the motion that led to the transfer of the Society's books to the Mitchell Library. He was whole-heartedly in favour of the amalgamation of the three societies and seconded Mr. Stewart's motion to that effect.

Alex. Ross acted as a delegate for the Society on many occasions, his last report being in connection with the 150th Anniversary of the Linnean Society.

He had a most delightful trip, with the late John Paterson and Dr. Cairnie of Largs, to Southern Spain, from which the Society benefited; and, when Robert Henderson was starting on his tour to Malaya, Ross met him in London and the two friends had a day of glorious reminiscences.

A.S.

### **Mr. Robert Henderson.**

Robert Henderson was born in Tipperary on the 19th March, 1864. He came to Glasgow at the age of six and, thanks to an aunt, he was ahead of a class of his years. Later, being strongly built, he went in for "the manly art", for fencing, gymnastics and swimming. He afterwards took to studying and excelled in all his classes. In addition to Science he studied French (The class met at 7 a.m.), Latin, Greek, Spanish, Portugese, German, Italian and Russian. He never reached the 100 per cent mark as the teacher reserved that for himself! In Botany, he and his friends George Ord and Alexander Ross were a source of pleasure to Prof. Thomas King and attained a First Class in Advanced Botany. He also attended classes in Chemistry with Ord and in Bacteriology with Ross.

In the course of his work he travelled to Norway, Germany and Cuba. He was foreign correspondent with William Beardmore and Co., Ltd., from 1909 - 1936, when he retired. He then spent a year's holiday in Malaya.

He became a member of the Andersonian Naturalists' Society in 1889 and ten years later joined Glasgow Natural History Society. He collaborated with George M. Ord in a paper on "The Tipulidæ of the Glasgow District" and, on the death of his friend, he wrote the Obituary published in Transactions, Natural History Society. He contributed the "List of Tipulidæ" in the Handbook of Natural History for the British Association in 1901 where he mentions his indebtedness to his friend Ross. Three large additions were further made by him, read to and published by the Natural History Society between 1904 and 1908. He also assisted with the Card Index in 1928. He was Joint Hon. Auditor from 1922-1926, being associated with John Paterson, Alex. Ross and others.

His week-end pastime, all through the year, was Walking. His party was referred to by him, in his " 'Citizen' Nature Notes", as "The Heavy Weather Club". He bequeathed his Diptera collection to the University of Glasgow which graciously received it. He was a keen Freemason and a Past-master of the Star Lodge 219. Robert Henderson died on the 12th July, 1940. To parody a well-known quotation:—He was—but words are wanting to say what say all a man should be—he was that.

A.S.

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# The Glasgow Naturalist

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(Including the *Transactions and Proceedings* of the Society)

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## SUMMARY OF CONTENTS

---

| PAPERS—   | PAGE. |
|---|-------|
| Some Recent Advances in Plant Microscopy - - - -      | 53    |
| Gordon Rattray, Ph.C.                                 |       |
| The Black-Tailed Godwit - - - - -                     | 73    |
| William Rennie  |       |
| The Fulmar Petrel in the Clyde Area - - - - -         | 75    |
| Thomas Robertson.                                     |       |
| Return of Summer Birds to the Clyde Area, 1940-1942 - | 76    |
| Thomas Robertson.                                     |       |
| DIGEST OF THE PROCEEDINGS OF THE SOCIETY - - - -      | 79    |
| FROM THE SECTIONAL REPORTS - - - - -                  | 88    |
| FROM THE SOCIETY EXCURSION REPORTS - - - - -          | 97    |
| <br>IN MEMORIAM—                                      |       |
| Hugh Boyd Watt, F.Z.S., M.B.O.U. (17/2/41) - - - -    | 99    |
| By Archibald Shanks.                                  |       |
| Thomas M'Grouther, F.S.A. (Scot.) (2/7/41) - - - -    | 101   |
| By James C. M'Grouther, B.Sc.                         |       |



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## SOME RECENT ADVANCES IN PLANT MICROSCOPY.

(THE "PETER GOODFELLOW" LECTURE.)

By GORDON RATTRAY, Ph.C.,

*Lecturer on Pharmacognosy, The Royal Technical College,  
Glasgow.*

Delivered 8th December, 1942.

In considering some recent advances in plant microscopy I am confining my attention to some very interesting work done in that branch of applied botany known as Pharmacognosy. Since this work arose from the necessity of dealing with specific difficulties in this subject, it might be an advantage to give you some idea of the scope of Pharmacognosy so that you may have a picture of the background which forced the attention of microscopists on this work.

Pharmacognosy is the science which deals with the knowledge of crude drugs, a crude drug being any plant, animal, or part of a plant or animal, which is used in medicine. Among many other things, the pharmacognosist must be able to recognise and describe crude drugs in the entire condition, when broken, or in the

powdered state. He has also to detect adulterants when they are present in the entire, broken or powdered drug. This might be illustrated by taking as example the crude drug Senna Leaves, which are fairly well known.

Senna leaves are the leaflets of the compound leaf of *Cassia acutifolia* (Alexandrian Senna) and *Cassia angustifolia* (Tinnevely or Indian Senna). It is, therefore, necessary that the leaves of these two species of *Cassia* should be distinguished from one another and from other species of *Cassia*, such as *Cassia obovata*. When the leaflets are in the entire condition this is relatively a simple matter to the trained person, but when they are broken or powdered their distinction by ordinary methods is almost impossible. Again, since Senna leaves are the leaflets of a compound leaf it might be expected that the rachis, petiole and stem, collectively known as "stalk," would be present in the drug. An undue amount of stalk would constitute an adulterant. In the whole drug this is easy to detect and estimate, but when the drug is powdered the detection of stalk becomes difficult and until recently the estimation of the amount of stalk was impossible. Senna leaf is an ingredient in Compound Liquorice Powder and methods had to be devised to estimate the amount of senna leaf in this compound powder.

It is seen, therefore, in the case of senna leaf that it became imperative to devise and perfect methods for the detection of closely allied leaves which are likely adulterants, to detect and estimate the amount of stalk which may be present in the powdered drug, and to estimate senna leaf in admixture. I have taken senna

leaf to illustrate the type of work that the pharmacognosist has to undertake, but what I have said applies to a greater or lesser extent to all crude drugs used in medicine.

Since these drugs are usually only parts of plants we do not have the other parts as a guide to identification. It would be a simple matter to identify the plant *Cassia acutifolia* from, say, *Cassia obovata*, but when we have only the dried leaves and when these may be broken or powdered, it is obvious that we must look for specific characters in the leaves themselves. When the leaves are from closely allied species of the same genus it would be expected that their microscopical characters will be so similar that it is only by careful observation and even measurement of their histological characters that they may be distinguished. It is seen, therefore, that in this work greater attention must be paid to specific details in plant tissue than is necessary in Botany where the chief work is the identification of plants, their general anatomical structure, physiology and classification. But classification does not go far enough for the pharmacognosist, and he must look for structural details and for numerical values relative to these structural details. The search for numerical values as an aid to the examination of crude drugs is one of the most important contributions to plant microscopy in recent years. This seems to be a logical development, and the trend of modern thought in this direction is well expressed by Prof. A. N. Whitehead when discussing the development of biological sciences in "Science and the Modern World" (1925) where he says: "Classification is

necessary. But unless you can progress from classification to mathematics, your reasoning will not take you very far"; and again, "Search for measurable elements among your phenomena, and then search for relations between these measures of physical quantities." Probably the first application of this conception was the differentiation of wheat and barley starches. Up to this time the size of starch granules present in plant tissue was recorded in a general way but no attempt was made to give more than approximate dimensions. Thus it was that the starches of wheat and barley, which are very similar, could not be distinguished, although it was noted that in general wheat starch contained some granules larger than those of barley. In all the textbooks I have consulted, the general size of these starches is given, usually with a note stating that wheat starch is slightly larger than barley; one textbook states that it would be impossible to detect a mixture of these starches. In 1922 T. E. Wallis<sup>1</sup>, the eminent pharmacognosist, made a critical comparison of the sizes and then noted that barley starch granules never exceeded  $39\mu$  in diameter while those of wheat reached a diameter of  $50\mu$ . This concise statement, as the result of careful measurement, now makes it possible to differentiate wheat and barley starches and to detect beyond doubt the presence of wheat starch when mixed with barley starch, an operation which was once thought to be impossible. Another example where measurement of starch grains is of value is in the detection of stalk in senna leaf<sup>2</sup>. The starch grains present in senna leaf never exceed  $6.5\mu$  in diameter whereas those of the stalk reach a maximum of



17 $\mu$ . This fact enables one to detect senna stalk in senna leaf even when present in small amount when it cannot be detected with certainty by the characters of the cells of its tissue. Ceylon Cinnamon Bark may be adulterated with Chinese Cinnamon Bark, and the latter may be detected by the size of its starch grains

| Species                | Sample | No. of measurements | Range of length $\mu$ | % greater than 38.4 $\mu$ . |
|------------------------|--------|---------------------|-----------------------|-----------------------------|
| <b>B. betulina</b>     | 1      | 300                 | 30.0-48.6             | 52.7                        |
|                        | 2      | 300                 | 25.7-51.6             | 45.3                        |
|                        | 3      | 300                 | 26.0-50.6             | 30.7                        |
| <b>B. serratifolia</b> | 1      | 108                 | 25.2-35.5             | 0                           |
|                        | 2      | 108                 | 22.9-38.4             | 0                           |
| <b>B. crenulata</b>    | 1      | 108                 | 27.4-36.6             | 0                           |
|                        | 2      | 108                 | 29.0-38.3             | 0                           |
|                        | 3      | 108                 | 25.9-38.4             | 0                           |
| <b>B. pulchella</b>    | 1      | 270                 | 27.7-40.7             | 9.6                         |
| <b>B. venusta</b>      | 1      | 270                 | 22.2-42.5             | 0.4                         |
| <b>B. ovata</b>        | 1      | 100                 | 24.5-37.1             | 0                           |
|                        | 2      | 100                 | 26.2-36.2             | 0                           |
| <b>B. Bathii</b>       | 1      | 270                 | 25.1-35.8             | 0                           |
| <b>B. Peglerae</b>     | 1      | 100                 | 23.9-30.1             | 0                           |
|                        | 2      | 100                 | 24.3-30.4             | 0                           |

Table 1

## Stomatal Length in Species of *Barosma*<sup>5</sup>

and also by the length of the isolated sclerenchymatous fibres.

Accurate measurement of the length of the guard cells of stomata, while in some cases of no value, has been shown in other cases to be a means of distinguishing closely allied species<sup>3</sup>. The leaves of *Barosma betulina*



can be distinguished from ten other species and varieties of *Barosma*. A consideration of Table I giving the stomatal length of these leaves will serve as an interesting example of how measurement may be interpreted with advantage. It will be noted that the stomatal length of all species, other than *B. betulina*, never exceeds  $38.4\mu$ . In the case of *B. betulina* some of the stomata do exceed  $38.4\mu$ , and by calculating the percentage of stomata greater than  $38.4\mu$  we have a means of detecting the presence of other species, for if a sample of *B. betulina* is adulterated with these other species of *Barosma* this percentage will fall below the standard.

A different kind of numerical value is the Vein Islet Number, which has been used with marked success. If a portion of a leaf is "cleared" there will be seen veins ramifying throughout the mesophyll dividing up into smaller veins and joining up again to give small enclosed areas or islets. The Vein Islet Number is the number of these islets per square millimetre. Levin published a very exhaustive paper on the "Taxonomic Value of the Vein Islet Areas<sup>4</sup>." His conclusions were as follows:—

1. For any given species the Vein Islet Number varies within narrow limits, the variation being such as might reasonably be expected when dealing with a biological subject. The numbers are sufficiently constant for use as a valuable specific character.
2. As one would anticipate, when the number of species in a genus is large the Vein Islet Numbers for several species necessarily overlap considerably and in certain species are practically identical.

This, however, does not vitiate the taxonomic value of the Vein Islet Number since, while some species cannot be thus delimited, many are easily distinguished by the magnitude of the Vein Islet Number.

3. When dealing with varieties one would expect a fairly close agreement in the Vein Islet Number. The approximation or divergence of the number found helps to indicate the degree of relationship existing between the varieties of a species, and in certain instances might suggest that further investigation might result in raising a variety to the rank of a species.
4. The Vein Islet Numbers do not bear any relationship to the total area of the leaf, since smaller leaved species may show much larger Vein Islet Numbers than larger leaved species of the same genus.

To determine the Vein Islet Number a small piece of leaf cut from the lamina midway between the margin and the midrib is treated with chloral hydrate or some other reagent so that the chloroplasts and starch are destroyed and the tissues become clear and transparent when mounted and examined by the microscope. A camera lucida is arranged and by means of a stage micrometer a line equivalent to one millimetre is drawn. On this line a square is constructed. The cleared leaf is placed on the microscope stage and the veins enclosed by the square drawn, the islets overlapping two adjacent sides being completed. The islets are then counted and where the islets are intersected by the sides of the square those on two adjacent sides are included and those on

the other two excluded. More accurate results are obtained by using a square or rectangle whose area is four square millimetres. Since only four square millimetres are required for the Vein Islet Number, one can carry out this determination on broken leaves, but not on powdered leaves, and therefore the Vein Islet Numbers are available for the identification of leaves which

| <b>C. angustifolia</b> |                  | <b>C. acutifolia</b> |                  |
|------------------------|------------------|----------------------|------------------|
| <b>Leaf</b>            | <b>V. I. No.</b> | <b>Leaf</b>          | <b>V. I. No.</b> |
| 1                      | 19.5             | 1                    | 25               |
| 2                      | 19.5             | 2                    | 25               |
| 3                      | 20               | 3                    | 26.5             |
| 4                      | 21               | 4                    | 26.5             |
| 5                      | 21               | 5                    | 27               |
| 6                      | 20               | 6                    | 27               |
| 7                      | 20.5             | 7                    | 27               |
| 8                      | 21               | 8                    | 28               |
| 9                      | 22.5             | 9                    | 29.5             |
| 10                     | 21               | 10                   | 25               |
| 11                     | 22.5             | 11                   | 25               |
| <b>Av.</b>             | <b>21</b>        | <b>Av.</b>           | <b>26</b>        |

Table 2      **Vein Islet Number** <sup>4</sup>

occur in commerce in the broken condition. Table II shows the Vein Islet Numbers for several samples of *Cassia angustifolia* and *Cassia acutifolia*, and it will be seen that these two species of *Cassia* can be distinguished by this means. The adulteration of these species with *Cassia obovata* may be detected since *C. obovata* has a Vein Islet Number of 16. Similarly *Erythroxylon Coca*, with a Vein Islet Number of 8 to 13, can be distinguished

from *E. truxillense*, with a Vein Islet Number of 15 to 26, and by this means also various species of the genus *Digitalis* can be differentiated<sup>3</sup>.

The "Palisade Ratio" is another numerical value which has been found useful in the identification of leaves. In 1925, Zörnig and Weiss<sup>5</sup> noted that in certain species of Compositae the number of palisade cells beneath an epidermal cell was characteristic. The term, "Palisade Ratio," was given to this value in 1933<sup>3</sup>, and has been used with success in a number of leaves. The method of determination of the Palisade Ratio is as follows:—

A small piece of leaf is treated with chloral hydrate solution or other clearing agent and mounted with the upper epidermis uppermost. By means of a camera lucida at least four epidermal cells are drawn. Next, by focussing down on the palisade cells, a sufficient number of palisade cells is drawn to cover the epidermal cells. The number of these palisade cells is counted, including those which overlap by more than half and disregarding those which overlap by less than half. This procedure is repeated and the average number of palisade cells below one epidermal cell is calculated. The Palisade Ratios for several species of *Barosma*<sup>3</sup> are shown in Table III. It will be observed that *B. betulina* can easily be distinguished from most of the other species. In the case of *B. serratifolia* and *B. crenulata*, where the value approximates that of *B. betulina*, the stomatal length (Table I.) can be used as a means of differentiation. *Scopolia* leaves (*Scopolia carniolica*), which are sometimes used to adulterate the leaves of *Atropa Belladonna*, are



almost identical with them even in the entire condition and consequently, when broken or powdered, it is a matter of great difficulty to distinguish them. By using the Palisade Ratio, it is possible to detect the presence of scopolia leaves in belladonna leaves even in the powdered state, since the Palisade Ratio of scopolia leaves is 2.5

| Species                | Sample | No. of determinations | Range of Palisade Ratio | % less than 10 |
|------------------------|--------|-----------------------|-------------------------|----------------|
| <b>B. betulina</b>     | 1      | 28                    | 10-26                   | 0              |
|                        | 2      | 24                    | 11-22                   | 0              |
|                        | 3      | 13                    | 16.5-26                 | 0              |
| <b>B. serratifolia</b> | 1      | 40                    | 8.5-17.5                | 7.5            |
|                        | 2      | 55                    | 9-18.5                  | 1.8            |
| <b>B. crenulata</b>    | 1      | 18                    | 9.5-18                  | 5.6            |
|                        | 2      | 18                    | 9-19                    | 11.1           |
|                        | 3      | 18                    | 8.5-13                  | 5.6            |
| <b>B. pulchella</b>    | 1      | 100                   | 6-16                    | 40.0           |
| <b>B. venusta</b>      | 1      | 34                    | 5-12.5                  | 85.3           |
|                        | 2      | 32                    | 6-12.5                  | 65.8           |
| <b>B. ovata</b>        | 1      | 40                    | 5-14.5                  | 62.5           |
|                        | 2      | 40                    | 6-14                    | 65.0           |
| <b>B. Bathii</b>       | 1      | 23                    | 8-24                    | 4.3            |
| <b>B. Peglerae</b>     | 1      | 14                    | 6-10                    | 85.7           |
|                        | 2      | 36                    | 6-11.5                  | 80.6           |

Table 3

### Palisade Ratio in Species of Barosma <sup>3</sup>

to 6, and only rarely greater than 5, whereas that of belladonna leaves is 6 to 10<sup>6</sup>.

There can be no doubt that, in the differentiation of closely allied plants, progress has been made by the use of accurate measurement and the correlation of these measurements, but it will have been noted that in the

size of starch granules, the length of stomata, the Vein Islet Number and the Palisade Ratio there is a range of variation. This is to be expected in the examination of a biological subject. Also, it is to be expected that when dealing with closely allied species that these ranges of variation may overlap. It seems obvious that there we have a definite handicap. In the case of stomatal length and Palisade Ratio this difficulty has been overcome to some extent by finding the percentage greater or less than a certain figure. But this does not go far enough, and it is my belief that sooner or later the science of statistics must be used to interpret and express the results more accurately and concisely. In a biological subject when a variation is found there is usually a figure or measure which occurs more frequently than any other. If a large number of measures is made and the graph of frequencies plotted, it would be expected that the curve would be a normal frequency curve. From this can be determined the mean, the mean deviation from the mean and the standard deviation. In this way the range of variation can be expressed more accurately and might be applied where the ranges overlap and thus closely allied species could be differentiated with a greater degree of certainty.

Having shown how the microscope has been of great value in identification, let us turn our attention to see if the microscope can also be used to estimate the amount of extraneous matter in powdered drugs. At the outset, I instanced the case of senna leaf which nearly always contains stalk. While it is desirable that all stalk should be removed, it would be almost an impossibility

to remove all stalk, indeed from a commercial point of view the labour entailed would so increase the cost as to make it impracticable. Thus a small amount of stalk, not exceeding 2 per cent., is allowed. Stalk in excess of this amount would constitute an adulterant. This, to mention only a few, applies to stalk in cloves, pedicels in capsicum, aerial stems in ipecacuanha root. During recent years Dr. T. E. Wallis and research workers under his direction in the School of the Pharmaceutical Society have developed methods, which are accepted as reliable and often the only methods, of obtaining definite results in the quantitative estimation of powdered vegetable tissues. The method is based on counting the number of characteristic particles, such as starch granules, pollen grains, sclerenchymatous cells and fibres occurring in one milligramme of the powder, or by measuring the area of sheets of cells one cell thick, such as epidermal cells, in one gramme of the powder. We have the alternative of doing this work on the pure drug or on the pure adulterant. At once the difficulty arises of how to compute the weight of material viewed in the microscope fields. A critical study of the spores of *Lycopodium clavatum*<sup>7</sup> has resulted in the solution of the problem. By careful measurement it was found that the size of the spores was very uniform, the variation being so small that one can safely regard a given number of spores as representing a definite weight of lycopodium. By using a haemocytometer the number of lycopodium spores in one milligramme has been found to be 94,000, and this is taken as the standard. Lycopodium spores possess other great advantages. They have a very



characteristic appearance and could not be confused with any other plant structure. They are about  $25\mu$  in diameter and thus compare in size with starch grains and plant cells. Lycopodium is also very resistant to all ordinary reagents, and the spores are not damaged when mixed by ordinary methods with other powders.

We know that 94,000 spores weigh 1mgm., then if we mix thoroughly known weights of lycopodium and another powder, we can determine the number of spores in a given number of fields and the number of characteristic particles occurring with these spores. We can now find the weight of lycopodium in these fields and therefore the weight of powder containing a definite number of characteristic particles.

Before going into details of the calculation there are two further points to be considered. The mixture of lycopodium spores and powdered substance must be mounted in a liquid medium. Also the substance usually requires to be treated to make the particles more readily recognisable. Thus the mixture of spores and powder is mixed with a suspending agent such as glycerin and water, olive oil, or a mixture of glycerin, mucilage of acacia and water. This ensures a uniform mixture which will not readily settle and so, when the sample is mounted, a truly representative sample of the mixture is obtained. In order to make the particles more visible they may, prior to suspension, be stained with iodine for starch, with phloroglucinol and hydrochloric acid for lignified tissue, or cleared with chloral hydrate solution to make the tissues more transparent. When counting particles it is necessary that a sufficient number



of fields spaced uniformly throughout the mount should be examined so that these will be representative. It has been found that normally twenty to twenty-five fields must be examined and, in order that no field is counted twice, and that the fields are evenly distributed, it is necessary to fix the selected fields in some way. To obviate the use of a mechanical stage, Wallis has devised a counting field finder. On a piece of thin cardboard a rectangle 3" x 1" is drawn and lines parallel to this are made at such distances that when the slide is brought to any line the desired field is brought into view. A circular hole to correspond with the cover slip is made in the centre of the rectangle. The card can be fixed to the stage by means of the slideclips. Further information and sketches of the counting field finder may be found in "Practical Pharmacognosy," Wallis, 3rd Edition, page 180 (J. & A. Churchill, 1936).

By considering a number of examples of quantitative determinations, the procedure and method of calculation will be made clearer.

*Determination of the Number of Starch Granules in one milligramme of Maize Starch.*

Equal quantities (say 0.04 gramme) of maize starch and lycopodium spores are accurately weighed and transferred to a glass plate about 10 centimetres square. The powders are mixed with a few drops of a mixture of glycerin and N/50 iodine, taking care not to blow away any of the mixture. More suspending agent is added till a thin smooth paste is obtained, and this is drained off into a clean dry specimen tube. The residue on the plate is rubbed with more suspending agent and

drained into the tube, the process being repeated until all the powder has been transferred to the tube. The contents of the tube are diluted with suspending agent to about 5 millilitres and mixed by gentle shaking. A drop of this liquid is placed on the centre of a slide and covered with a cover slip. The number of starch granules and lycopodium spores is counted in 25 selected fields, using a counting field finder. As an additional aid to counting a net ruled scale should be placed in the microscope eye piece. The number of starch granules occurring with 94,000 spores, *i.e.*, with one milligramme, is calculated. But the starch and spores were in equal weight, therefore this must be the number of starch granules in one milligramme of maize starch. This number has been found to be 850,000.

In the examination of wheat and barley starches already mentioned, it was observed that wheat starch always contained a number of granules greater than  $40\mu$  in diameter while barley starch did not. By the above method it is now possible to find the number of wheat starch granules greater than  $40\mu$  in one milligramme. This number is 400, and using this figure as standard it is possible to estimate the proportion of wheat and barley starches in admixture. Previously it was thought impossible to detect a mixture of wheat and barley starches, but now as the result of accurate observation, these starches can be detected and even estimated when mixed. In the same way the number of pollen grains in insect flowers, or the number of starch granules in powdered drugs containing starch can be estimated. The latter value can be used to estimate a drug containing

starch in another containing no starch. As an example a mixture of powdered gentian and ginger can be estimated. The data and the method are taken from "Practical Pharmacognosy," Wallis, 3rd Edition. (J. & A. Churchill, 1936.)

Gentian contains no starch while ginger does have starch granules present. The method is as follows :—

Examine the mixture and make a rough note of the starch present. Mix equal weights of genuine gentian and ginger and note the amount of starch, comparing this with the unknown mixture. From this comparison make a mixture of genuine gentian and ginger so that the amount of starch is about the same as in the unknown, say 5 per cent. of ginger in gentian. Weigh an accurate weight of this 5 per cent. mixture and mix with an accurate weight of lycopodium spores. Using this standard mixture the number of starch granules per mgr. of ginger is determined as follows :—

Weight of lycopodium 0.0221 gm., i.e., 22.1 mgr.

Weight of 5% mixture 0.5020 gm., i.e., 502 mgr.

After mixing with the suspending medium and counting the particles in ten fields, the following numbers are obtained :—

Lycopodium spores 9, 10, 13, 8, 6, 7, 11, 12, 10, 9 = 95.

Ginger starch granules 25, 28, 40, 32, 22, 26, 31, 34,  
36, 26 = 300.

Now 22.1 mgr. of lycopodium = 22.1 x 94,000 spores  
and since 95 lycopodium spores occur with 300 ginger  
starch granules

$$\frac{22.1 \times 94,000 \text{ lycopodium spores occur with } 300}{95} = 6,560,000 \text{ ginger starch granules.}$$

Thus 502 mgr. of the 5% mixture contain 6,560,000 ginger starch granules so that 1 mgr. of the 5% mixture

contains  $\frac{6,560,000}{502} = 13,070$  ginger starch granules,

and 1 mgr. of the ginger contains  $13,070 \times 20$

$= 261,400$  ginger starch granules.

The percentage of ginger in the mixture of unknown composition is determined as follows :—

Weight of lycopodium 0.0215 gm., *i.e.*, 21.5 mgr.

Weight of unknown mixture 0.5383 gm., *i.e.*, 538.3 mgr.

After mixing with the suspending medium and counting the particles in ten fields, the following numbers are obtained :—

Lycopodium spores 7, 18, 8, 16, 12, 9, 10, 14, 11,  
12 = 117.

Ginger starch granules 25, 41, 25, 37, 31, 26, 27, 36,  
28, 29 = 305.

Now 21.5 mgr. of lycopodium =  $21.5 \times 94,000$  spores and since 117 lycopodium spores occur with 305 ginger starch granules,  $21.5 \times 94,000$  lycopodium spores occur

with  $\frac{305 \times 21.5 \times 94,000}{117} = 5,267,000$  ginger starch

$$= \frac{5,267,000}{261,400}$$

$= 20.15$  mgr. of ginger.

Hence 538.3 mgr. of unknown mixture contain 20.15 mgr. = 3.75 per cent. of ginger.

The above method is suitable for quantitative estimation when the powder or its adulterant contains



particles of well defined shape and size, such as starch, pollen grains or even isolated sclerenchymatous cells or fibres, and the number of these per milligramme can be used as the standard. When the substance contains a characteristic tissue one layer thick another method of estimation is applicable. Examples of such tissue are the epidermal tissue of leaves<sup>8</sup> or the sclerenchymatous layer of certain seeds such as linseed<sup>9</sup>. Here it is not the number but the area per gramme. The epidermal area per gramme of senna leaf will serve as an example. The data and the method of calculation are again taken from Practical Pharmacognosy, Wallis, 3rd Edition.

The method of carrying out the estimation is as follows :—

Weigh accurately some senna leaf powder and lycopodium, mix with chloral hydrate solution on a slab and transfer to a glass tube. Suspend in a boiling water bath till the leaf is cleared, add suspending agent, mix, and mount a drop on a slide. Select 25 fields and count the number of spores and, by means of a camera lucida, draw the outline of the epidermal particles in the same 25 fields. Make the tracings to a definite magnification, say 400 diameters, and having cut out the tracings weigh them. By weighing a piece of the same paper of known area, the area of the tracings can then be calculated.

Weight of senna leaf powder 0.1128 gm.

Weight of lycopodium spores 0.0529 gm.

Number of lycopodium spores in 25 fields = 307.5.

Epidermal area of particles in the same 25 fields at a magnification of 400 diameters = 254.12 sq. cm,

Actual epidermal area of particles

$$= \frac{254.12 \times 100}{160,000} \text{ sq. mm.}$$

$$= 0.15883 \text{ sq. mm.}$$

Thus 307.5 spores correspond to 0.15883 sq. mm. of epidermis, so that 52.8 x 94,000 spores correspond to

$$\frac{0.15883 \times 52.8 \times 94,000}{307.5 \times 100} = 25.64 \text{ sq. cm. of epidermis.}$$

0.1128 gm. of senna powder has 25.64 sq. cm. of epidermis and hence 1 gm. of senna powder has

$$\frac{25.64}{0.1128} = 227.5 \text{ sq. cm. of epidermis.}$$

If the epidermal area is required for subsequent reference as a standard the area must be calculated on the senna leaf dried at 100°C. as the air-dried leaf contains a variable amount of moisture. The above sample contained 7.63 per cent. of moisture, so that 1 gm. of powdered senna leaf dried at 100°C. has

$$\frac{227.5 \times 100}{92.37} = 246 \text{ sq. cm. of epidermis.}$$

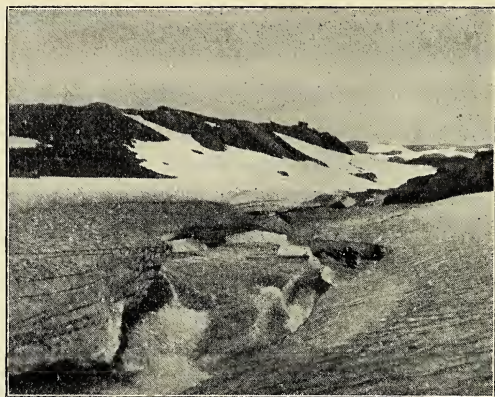
Using this figure we can calculate the amount of senna stalk in senna powder or the amount of senna leaf in Compound Liquorice Powder.

These examples will suffice to give the basis of the "lycopodium method," as it is called, for quantitative microscopy<sup>10, 11</sup>. The method has particular value in pharmacognosy and it is due to the brilliant work of Dr. Wallis, the outstanding British pharmacognosist, who has led the way in many recent advances in plant microscopy. Among the many varied applications of

the lycopodium method may be instanced the fineness of the particles in chocolate<sup>12</sup>, a character upon which depends the pleasant smoothness of the taste of the better grades, and the fineness of the particles in tooth-pastes, metal polishes and emery powders.

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- <sup>10</sup> Wallis, Jour. Roy. Micro. Soc., 1920, 169.
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The melting of the snows.

## THE BLACK-TAILED GODWIT.

By WILLIAM RENNIE.

In recording for the first time a pair of Black-tailed Godwits (*Limosa limosa limosa*, Linn.) seen at Possil Marsh on the 11th and 12th May, 1938 (v. page 37), and knowing how rare this bird is in the Glasgow district, it seems a strange coincidence that I should receive at the time my copy of "The Scottish Naturalist," which contained interesting Autumn, Winter and Spring reports on this bird from districts as far apart as the Fife coast, where it is not rare, and the Isle of Islay. The closing words of Misses Baxter and Rentoul's communication should give an impetus to the field observer for a more rigid search for a bird we always regarded as a Passage Migrant. They read "It would appear that the Black-tailed Godwit is becoming commoner in Scotland and remaining as a winter visitor."

I naturally began to make investigations, among available publications, for records of occurrences in the Glasgow district, adhering to the ten mile radius. (v. page 37). There are many records outwith the Clyde Area but very few within it. These are the records:—

21/9/99. John Robertson saw one bird at Balgray Dam. (Scot. Nat. 1915).

4/8/07. John Paterson saw three birds in summer plumage at Gadloch, Lenzie. They disappeared overnight. (Ann. Scot. Nat. Hist. 1907). "The only appearance known at this season," John Paterson in



“ Birds of Glasgow District.” (Glas. Nat. vol. 2).

29/8/09. John Robertson saw one at Waulkmill Glen Dam.

12/9/09. He again saw one there. (Glasgow Nat. vol. 2).

3-17/9/11. John Robertson saw four at Balgray Dam. Two of them were not seen after Sept., 10th. (Scot. Nat. 1915).

I have been unable to trace any records during the next 20 years ; but I have the three following records from Mr. Nicol Hopkins :—

24/4/32. A pair at Summerston (Breeding plumage).

31/8/32. Male bird at Balgray Dam (Breeding plumage).

4/5/38. Female bird at Summerston (Breeding plumage).

11-12/5/38. My own record at Possil March—a pair in breeding plumage. (v. page 37).

24/5/39. Nicol Hopkins saw one bird at Summerston.

The information gained throughout, though somewhat meagre, is rather of an interesting nature regarding the topographical distribution of the five localities mentioned, and the period of occurrence of the *Black-tailed Godwit*.

## THE FULMAR PETREL IN THE CLYDE AREA.

By THOMAS ROBERTSON.

The first report for the Fulmar (*Fulmarus glacialis glacialis*) in the Clyde Area came from the Mull of Kintyre. In 1929 Mr. James B. Brown stated that the birds could be seen flying round the cliffs there in the breeding season. Mr. T. Thornton MacKeith has received yearly notes from a friend living nearby who has kept a watch for the Fulmar on cliffs actually within the boundaries of Clyde. In 1937 a pair settled in the first week in May, but no nest could be discovered. Similarly in 1938 and 1939 nothing was to be seen, but in 1940 a young bird, just beginning to get its feathers, was found. As many as 30 to 40 birds frequent this neighbourhood each spring, but, as nesting time approaches, the numbers dwindle until less than a dozen are left. Mr. MacKeith's correspondent thinks that Jackdaws may steal the eggs. He writes in 1942, "On Sunday, 27th May, I was sure there were four on nests, but on 7th June there were only two sitting."

The Fulmar has been reported from Ailsa Craig for a number of years. Mr. James Fisher, Secretary of the British Trust for Ornithology, visited Ailsa Craig each year from 1936, but it was only in 1939 that he was able to record breeding taking place. He writes in 1941 that the birds were back again that year.

In 1941 Mr. Ian Robertson, on holiday in South Ayrshire, discovered a small colony on a cliff at the Bennane Head. One egg was seen on May 27th. No information could be obtained as to the presence of birds in previous years. In June, 1942, there were eight or nine pairs at the same place.

# RETURN OF SUMMER BIRDS TO THE CLYDE AREA.

Compiled by THOMAS ROBERTSON.

1940.

|       |    |                          |                            |
|-------|----|--------------------------|----------------------------|
| Mar.  | 11 | Lesser Black-backed Gull | Albert Bridge, Glasgow     |
| „     | 25 | Chiffchaff               | Auchincruive, Ayr          |
| „     | 26 | Sand Martin              | Dalry                      |
| „     | 28 | Wheatear                 | Dalry                      |
| April | 4  | Swallow                  | Milliken Park              |
| „     | 5  | Willow Wren              | Largs                      |
| „     | 8  | Common Sandpiper         | Garrion Bridge             |
| „     | 17 | White Wagtail            | Clyde, Motherwell          |
| „     | 22 | House Martin             | Summerston                 |
| „     | 23 | Cuckoo                   | Largs                      |
| „     | 25 | Yellow Wagtail           | Lochwood, Coatbridge       |
| „     | 25 | Corncrake                | Dalry                      |
| „     | 25 | Sedge Warbler            | Richmond Park,<br>Glasgow  |
| „     | 25 | Redstart                 | Richmond Park,<br>Glasgow  |
| „     | 27 | Tree Pipit               | Milngavie                  |
| „     | 27 | Common Whitethroat       | Darvel                     |
| May   | 1  | Swift                    | Possil Marsh, Glasgow      |
| „     | 7  | Whinchat                 | Dalry                      |
| „     | 8  | Garden Warbler           | Rouken Glen                |
| „     | 10 | Wood Wren                | Cadzow                     |
| „     | 11 | Common Tern              | Dalry                      |
| „     | 15 | Spotted Flycatcher       | Carmichael,<br>Lanarkshire |

Compared with last year's list, 11 species were earlier this year and 10 later in arriving. Taking the average arrival dates over a period of 25 years, 11 arrived before the average date, 3 were exact to the day and 8 were later than the average. The Redstart was not reported last year.

1941.

|       |    |                          |   |
|-------|----|--------------------------|---|
| Mar.  | 5  | Lesser Black-backed Gull | Summerston                                  |
| „     | 30 | Chiffchaff               | Largs                                       |
| April | 1  | Wheatear                 | Dalry & Bishopbriggs                        |
| „     | 12 | Common Sandpiper         | Kilmacolm                                   |
| „     | 14 | Sand Martin              | Clyde at Motherwell                         |
| „     | 14 | Swallow                  | Dalry                                       |
| „     | 15 | Willow Wren              | Largs                                       |
| „     | 20 | Tree Pipit               | Motherwell                                  |
| „     | 21 | White Wagtail            | Motherwell                                  |
| „     | 21 | House Martin             | Luggiebank                                  |
| „     | 23 | Cuckoo                   | Dunoon                                      |
| „     | 27 | Yellow Wagtail           | Lochwood, Coatbridge<br>Clyde at Motherwell |
| „     | 27 | Common Tern              | White Loch, Stewarton<br>Road               |
| „     | 30 | Corncrake                | Fenwick                                     |
| May   | 3  | Common Whitethroat       | Dalry & Milngavie                           |
| „     | 3  | Whinchat                 | Milngavie                                   |
| „     | 3  | Wood Wren                | Campsie                                     |
| „     | 4  | Redstart                 | Richmond Park,<br>Glasgow                   |
| „     | 7  | Swift                    | Clyde at Motherwell                         |
| „     | 9  | Sedge Warbler            | Darvel & Lochwood,<br>Coatbridge            |
| „     | 9  | Spotted Flycatcher       | Torrance                                    |
| „     | 18 | Garden Warbler           | Pollok Park, Glasgow                        |
| „     | 18 | Blackcap Warbler         | Pollok Park, Glasgow                        |

6 were earlier this year than last. 1 was on the same date. 15 were later in arriving. Taking the average arrival dates over a period of 25 years, 7 arrived before the average date, 1 on the exact date and 14 were later than the average. The Blackcap was not reported last year.



1942.

|       |    |                          |                                    |
|-------|----|--------------------------|------------------------------------|
| Mar.  | 8  | Lesser Black-backed Gull | Albert Bridge, Glasgow             |
| April | 1  | Sand Martin              | Largs                              |
| „     | 1  | White Wagtail            | Summerston                         |
| „     | 2  | Wheatear                 | Dalry                              |
| „     | 8  | Swallow                  | Motherwell & Dalserf               |
| „     | 12 | Willow Wren              | Luggiebank                         |
| „     | 14 | Common Sandpiper         | Dalry                              |
| „     | 15 | Chiffchaff               | Dalry & Wemyss Bay                 |
| „     | 19 | Cuckoo                   | Largs                              |
| „     | 19 | Tree Pipit               | Bearsden                           |
| „     | 22 | House Martin             | Motherwell                         |
| „     | 27 | Yellow Wagtail           | Motherwell                         |
| May   | 2  | Corncrake                | Bearsden                           |
| „     | 3  | Common Tern              | Castle Semple Loch<br>& Motherwell |
| „     | 4  | Sedge Warbler            | Darvel                             |
| „     | 5  | Swift                    | Kilmacolm                          |
| „     | 5  | Whinchat                 | Dalry                              |
| „     | 6  | Common Whitethroat       | Darvel                             |
| „     | 7  | Garden Warbler           | Darvel                             |
| „     | 9  | Wood Wren                | Balfron                            |
| „     | 9  | Ring Ousel               | Glen Arbuck                        |
| „     | 14 | Spotted Flycatcher       | Richmond Park,<br>Glasgow          |
| „     | 15 | Redstart                 | Richmond Park,<br>Glasgow          |
| „     | 24 | Blackcap Warbler         | Linn Park, Glasgow                 |

9 species were earlier than their average dates, 1 arrived on the exact day and 12 were later than usual. Compared with last year's list, 9 species were earlier, 1 was on the same date and 13 were later in arriving.

## DIGEST OF THE PROCEEDINGS OF THE SOCIETY.

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13TH JANUARY, 1940.

The first meeting of the Tenth Session was held, the President, Mr. Wm. Russell, in the chair. Sederunt 48 members.

The Photographical Section, Convener Mr. J. D. Leslie, gave its annual exhibition of lantern slides. These included slides in colour (Views of Jamaica) by Miss Agnes A. Meikle, B.Sc., N.D.D., N.D.A.; studies of Doune Castle, etc., by Mr. John G. Cree; and colour transparencies by Messrs. Wm. Milroy and David Hodgson.

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10TH FEBRUARY, 1940.

The Annual Business Meeting of the Society was held, Mr. Wm. Russell, presiding. Sederunt 40.

The reports of the Society's activities were read and approved. The following new office-bearers were elected:—President, Mr. John G. Cree; Vice-President, Professor John Walton; Section Conveners—Botanical, Mr. Richard Prasher; Geological, Mr. Wm. J. Cannon; Microscopical, Mr. George Maclean, F.R.M.S.; Editor of Transactions, Dr. Donald Patton; Members of Council, Professor Hindle, Messrs. Wm. Russell and Jas S. Nicol.

Mr. Rennie proposed that members serving with His Majesty's Forces should be exempt from paying subscriptions during the period of the war. This was agreed to.

Miss Liliass Small gave a talk on "Amateur Botany in the Scottish National Park."

Mr. Thos. Martin, 946 Dumbarton Road, W.4, was admitted a member.

9TH MARCH, 1940.

Eighty-seven members and friends were present.

Mr. J. Allan Garrick, B.Sc., gave an account of a climbing expedition in Arctic Norway. It was beautifully illustrated by Agfa Films.

Professor Hindle exhibited a specimen of the Mole Cricket.

The following were admitted to membership:—Miss Jessie G. Bain, 2 Kirklee Quadrant, W.2; Mr. Ian Robertson, B.L., 1768 Great Western Road, W.3; and Messrs. Jas. G. Hunter, B.Sc., and John Hunter, 61 Glasserton Road, S.3.

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6TH MAY, 1940.

Mr. Jas. Bartholomew read a paper on "Changes in Bird Life."

Mr. Wm. Rennie read a paper, "An Inquiry into the Distribution of the Corn Bunting (*Emberiza miliaria*, Linn.) in North Glasgow"—the detailed results of his observations on this bird at Possil Marsh and neighbourhood from 1908 till 1940, shewing fluctuations in numbers and the gradual decrease in latter years.

Mr. R. H. Johnstone, M.A., exhibited specimens of two fungi, *Morchella esculenta*, (Linn.) and *M. semilibera*, D.C., and of Toothwort.

Mr. Wm. Christie, 26 Blythswood Road, Renfrew, was elected a member.

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27TH MAY, 1940.

The meeting was devoted to exhibits of the work and methods of the various sections of the Society.

The following new member was admitted :—Rev. Edward F. Vernon, M.A., 12 Kensington Gate, W.2.

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10TH JUNE, 1940.

Mr. Thomas Robertson submitted a list of the first arrivals of Summer Birds in the Clyde Area. (v. page 76).

Mr. Nicol Hopkins contributed a paper on "The Birds of the Darvel District." (v. page 24).

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24TH SEPTEMBER, 1940.

Dr. G. Bond delivered a lecture on "Nitrogen Fixation by Living Organisms."

Mr. James Jack contributed a note on the occurrence of the Peacock Butterfly at Luggiebank.

The following new member was admitted :—Mr. John S. Crawford, 10 Ashgrove Street, Ayr.

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8TH OCTOBER, 1940.

Dr. Blodwyn Lloyd exhibited the following Scottish Film Council Biology films :—"The Thistle," "Wading Birds," "Central America," "The Fern" and "Spiders."

Mr. B. T. Cromwell, B.Sc., Ph.D., Horticultural Department, Agricultural College, Glasgow, was admitted to membership.

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12TH NOVEMBER, 1940.

Dr. J. B. O. Sneed delivered a lecture on "Aquarium Fishes," describing in detail the four main factors which should receive attention, viz., Oxygenation of the water; Light; Temperature; Food. The lecture was illustrated by lantern slides and aquarium specimens.



10TH DECEMBER, 1940.

The Goodfellow Lecture was delivered by Dr. B. T. Cromwell, his subject being "The Mode of Production of Drugs in Plants."

An Obituary Notice of Mr. Robert Henderson, by Mr. Archd. Shanks, was read. (v. page 50).

Miss Helen L. Fraser, B.Sc., Rockville, Arthur Avenue, Airdrie, was admitted a member.

14TH JANUARY, 1941.

The first meeting of the Eleventh Session was held, Mr. John G. Cree, President, in the chair. Sederunt 36.

An Obituary Notice of Mr. Alexander Ross, F.E.I.S., by Mr. Archd. Shanks, was read. (v. page 48).

An exhibition was given by the members of the Photographical Section. Mr. W. M. Pettigrew shewed a film in colour of "Animals at the Edinburgh Zoo"; Mr. Robert Gray, Bird Life Studies; Mr. Wm. Milroy, Pictorial Compositions in colour; and Mr. Hodgson, slides in colour—Portraits and Groups.

11TH FEBRUARY, 1941.

The Annual Business Meeting of the Society was held, Mr. John G. Cree presiding.

The usual reports were submitted and approved. The following new office-bearers were appointed:—Vice-President, Mr. John R. Lee; Members of Council, Miss Mabel G. Scott, M.A., B.Sc., Messrs. Edward J. A. Stewart, M.A., B.Sc., and Mr. John G. Connell, F.R.M.S., for three years; Mr. Robert McLean, M.A., for two years and Miss Phyllis Woodland for one year.

Mr. John R. Lee exhibited *Carex divisa*, Huds.,—a NEW RECORD for the Clyde Area—from Clarkston, Renfrewshire, per favour of Mr. Robert Mackechnie, B.Sc.

The following new members were admitted:—Miss Helen Longmuir, 8 Walnut Crescent, N.; Mr. J. Allan Gardner, Parkview, Plains, Airdrie; Mr. J. R. Fethney, M.P.S., 12 Bridgegate, Irvine.

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11TH MARCH, 1941.

Mr. Wm. John Cannon read a paper on "The Geology of the Oban District." It was illustrated by lantern slides and rock specimens.

The following new members were admitted:—Mr. Harry Burman, A.I.C., A.M.I.Chem.E., 82 Dee Street, Riddrie, E.1., and Mr. Arthur D. Burman, 41 Trinley Road, W.3.

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24TH APRIL, 1941.

Mr. Robert Gray read a paper on "The Birds of Carmichael and District." The area included the Parishes of Carmichael, Covington and Pettinain, in Lanarkshire. 102 species were listed, including the Crossbill, Jay and Great Spotted Woodpecker.

The following new members were admitted:—Mr. Samuel Parkinson, 22 Lindsay Drive, W.2; Mr. Anthony S. Downes, B.Sc., Dept. of Zoology, The University, Glasgow.

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8TH MAY, 1941.

Mr. Richard Elmhirst, F.L.S., read a paper, by Dr.

Norman Morrison, entitled "The Story of the Common Eel."

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12TH JUNE, 1941.

Mr. Thomas Robertson submitted a list of the first arrivals of Summer Birds in the Clyde Area in 1941, compiled from records by members and friends. (v. page 77).

Mr. Richard Elmhirst, F.L.S., read a paper entitled "An Autumn Diary, Sept.—Nov., 1940."

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9TH SEPTEMBER, 1941.

The Chairman intimated the death of three members of the Society: Mr. Hugh Boyd Watt, Mr. Thomas McGrouther, Mr. William Burns.

The meeting was devoted to the exhibits from the various sections.

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14TH OCTOBER, 1941.

Mr. H. R. J. Conacher read a paper on "Water Bloom and its Geological Implications."

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11TH NOVEMBER, 1941.

The capture of a Clouded Yellow Butterfly (*Colias Croceus Edusa*) in Richmond Park, by Mr. Nicol Hopkins, on 13th September, led Mr. William Russell to investigate the records of the butterfly in this country. He traced its appearance here, from the controversial accounts published in 1836, until to-day.

Mr. John R. Lee exhibited specimens of *Hypnum intermedium*, Lindb. and *H. vernicosum*, Lindb., mosses from the Little Loch, Mearns, Renfrewshire. He also

shewed specimens, from Glasgow University Herbarium, collected by Miss Liliass Small, 6th July, 1941, on the roadside by Holy Loch, Argyll, v.c.98, of *Solanum Dulcamara*, Linn., with both purple and white flowers—NOT PREVIOUSLY RECORDED for this vice-county.

The following new members were admitted:—Miss Edith Smillie, 68 Gilmour Street, Eaglesham; Miss Ada McCallum, B.Sc., 22 Terregles Avenue, S.1; Miss Jean Paterson, B.Sc., Abernethie, Catrine, Ayrshire; Miss Liliass Small, 356 West Princes Street, C.4; Mr. Thomas B. Gordon, 133 Muirdrum Avenue, Cardonald.

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#### 9TH DECEMBER, 1941.

Miss Margaret W. Jepps, M.A.(Cantab.), delivered the Goodfellow Lecture on "The Life of the Foraminifera." The lecture was illustrated by lantern and micro slides. After a short introduction to the Foraminifera the lecturer described the mode of life and the life-history, as far as it is known, of *Polystomella*, on which she had recently been carrying out an intensive investigation.

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#### 13TH JANUARY, 1942.

The first meeting of the Twelfth Session was held, Mr. Wm. Russell presiding.

The Photographical Section gave its annual exhibition. Lantern slides were shewn by Mr. John G. Cree—Radiolaria; Mr. James Kirkwood—General; Mr. James Jack—The Waxwing, Norwegian Scenery. Mr. W. M. Pettigrew shewed films in colour of "Bens and Glens, Rivers and Lochs from Balloch to Loch Maree."

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## 10TH FEBRUARY, 1942.

The Annual Business Meeting of the Society was held, Mr. John G. Cree, President, in the chair.

The Society's Reports were read and approved. The following new office-bearers were elected :—Vice-President, Mr. Geo. McLean ; Minute Secretary, Miss Phyllis Woodland ; Members of Council, Misses Jean C. D. Craig, B.Sc., and Agnes A. Meikle, B.Sc., N.D.D., N.D.A., and Mr. Robert Gray.

It was agreed to form a Natural History Brains Trust.

The following new members were admitted :—Mr. Sidney Tailby B.Sc., A.I.C., 38 Eglinton Road, Ardrossan ; Mr. Robert Kerr, Mossend, 61 Bentinck Street, Troon.

## 10TH MARCH, 1942.

Mr. John Anthony Downes, B.Sc., delivered a lecture on "Insects in Stored Food Products," illustrated by exhibits and lantern slides.

The Nat. Hist. Brains Trust was in session.

## 14TH APRIL, 1942.

Mr. Gordon Rattray, Ph.C., lectured on "The Collecting and Drying of Medicinal Plants."

Mr. W. J. Cannon contributed a paper on "The Geology of Auchenroch Glen," illustrated by lantern slides.

The Nat. Hist. Brains Trust was in session.

## 12TH MAY, 1942.

Mr. J. T. Smith made some observations on "The Flow

of Sap in *Elodea canadensis*."

Mr. William Rennie exhibited a specimen, from Dalserf, of *Puccinia adoxae* in its teleutospore stage, parasitic on *Adoxa Moschatellina*.

The Nat. Hist. Brains Trust was in session.

The following new members were admitted:—Mr. Alfred Holden, c/o Turner, 77 Hill Street, C.3; Mr. Lionel E. Holloway, Ravenscraig, Paisley Road, Renfrew; Mr. W. A. F. Balfour-Browne, Brae, Dumfries; Mr. Alexr. Murdoch, 107 Maxwell Avenue, Westerton; and Mr. Aird Macintyre, 15 Manor Road, Drumchapel, Glasgow.

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#### 9TH JUNE, 1942.

Mr. Thomas Robertson submitted a list of the first arrivals of Summer Birds in the Clyde Area in 1942, compiled from reports of members and friends. (v. page 78).

Some interesting botanical specimens were exhibited by members.

The following new members were elected:—Mr. Murray Fernie, 113 Novar Drive, W.2; Mr. Matthew Doyle, 30 Raglan Street, C.4

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#### 13TH OCTOBER, 1942.

Mr. John R. Lee read a paper on "The Flora of Dunbartonshire, v.c.86.A." The area, which includes the parishes of Kirkintilloch and Cumbernauld, is being specially surveyed by the Botanical Section, and the author contemplates publishing the completed work at an early date.

Dr. J. Inglis Cameron and Mrs. Cameron, 273 Knightswood Road, W.3, were elected members of the Society.

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#### 10TH NOVEMBER, 1942.

Mr. R. S. Tailby, B.Sc., A.I.C., delivered a lecture "The Convolvulus Moth," illustrated by photographs, maps and specimens.

Mr. James C. Graham gave a talk on "Beekeeping."

Mr. Wm. McLean submitted a report on the work of the Geological Section for the years 1935 to 1939.

Lieut. F. W. Smith, Glenstrae, Kilcreggan, Dunbartonshire, was elected a member.

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#### 8TH DECEMBER, 1942.

The Goodfellow Lecture was delivered by Mr. Gordon Rattray, Ph.C., his subject being "Some Recent Advances in Plant Microscopy." (v. page 53).

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### FROM THE SECTIONAL REPORTS.

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#### Botanical Section.

From 1938 till 1942 this section has devoted part of its annual excursion programmes to a floristic survey of the parishes of Kirkintilloch and Cumbernauld (v-c. 86.A.)—the detached portion of the political county of Dunbarton. The work to date was summed up by Mr. John R. Lee in a paper to the Society on 13th October, 1942. The whole scheme is nearing completion.

In addition to the excursions entailed by the above, several profitable outings were taken,

1940.

17th August. Dalry. A striking hybrid *Potentilla* was found on the railway embankment, in fine flower. It appears to be a cross between *P. Tormentilla*, Sibth., and *P. reptans*, Linn. It has unusually large flowers, mostly of the four petal type characteristic of the former and the creeping habit of the latter.

1941.

26th April. Skelmorlie provided *Chrysosplenium alternifolium*, Linn., and *Epilobium nummularifolium*, R. Cunn.

20th June. At the Little Loch, Loganswell, there were seen :—*Nuphar luteum*, Sm., *Sedum villosum*, Linn., *Oxycoccus palustris*, Pers., *Menyanthes trifoliata*, Linn., *Carex aquatilis*, Wahl., and *C. limosa*, Linn. Here, too, were seen *Hypnum vernicosum*, Lindb., and *H. intermedium*, Lindb.

9th August. At Helensburgh, these specimens were found :—*Lepidium Smithii*, Hook., *Hypericum humifusum*, Linn., *Rubus Moylei*, Bart. et Ridd., var. *scoticus*, Bart. et Ridd., *Sedum Telephium*, Linn., *Lactuca muralis*, Fresen., *Bartsia viscosa*, Linn., and *Poa nemoralis*, Linn.

1942.

8th May. Milngavie. A visit was paid to the old lade running into the Craigton Burn where it enters the swamp at the old mill-dam near Clober. Naturalised plants, which have long been known to grow here, were still going strong, viz., *Neillia opulifolia*, Linn., *Spiræa salicifolia*, Linn., *Rhamnus Frangula*, Linn., *Cornus sanguinea*, Linn., and *Sambucus nigra*, Linn., var.



*laciniata*, Linn.

23rd May. Near Cumbernauld. *Trientalis europæus*, Linn., was in fine flower.

30th May. Bardowie. *Epilobium nummularifolium*, R. Cunn. Another area for this rapidly spreading introduction to "Clyde," and *Myosotis arvensis*, Hoffm., var. *umbrosa*, Bab.

13th June. Riddrie to Baillieston, Monkland Canal. *Hippuris vulgaris*, Linn., *Galium Mollugo*, Linn., and *Lycopus europæus*, Linn.

27th June. Dalry. *Echium vulgare*, Linn., is still a feature here. Among other plants noted were:—*Ranunculus bulbosus*, Linn., *Petasitis albus*, Gærtn., *Tragopogon pratense*, Linn., *Trisetum flavescens*, Beauv., and *Ophioglossum vulgatum* Linn.

8th August. Tollcross Sand-pits. A considerable number of the uncommon plants for which this locality is noted were found, viz., *Sisymbrium altissimum*, Linn., *Melilotus alba*, Desr., *M. arvensis*, Wallr., *Ornithopus perpusillus*, Linn., *Cirsium arvense*, Scop., var. *setosum*, C. A. Mey., *Campanula rapunculoides*, Linn., *Erythræa Centaurium*, Pers., and *Juncus glaucus*, Ehrh.

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### Entomological Section.

#### Coleoptera.

*Psylliodes chrysocephala*, L., the Cabbage Stem Flea Beetle, at Mossspark, attacking cabbages. 9/5/40.

*Ceuthorrhynchus quadridens*, Panz., the Cabbage Stem Weevil, found as larvae burrowing into the leaf-stalks of White Turnip. 1941.

*Tenebrio obscurus*, F. The living mealworms of this species and adults of the Saw-toothed Grain Beetle, *Oryzaephilus surinamensis* (L.), were found in a consignment of oats which arrived in Glasgow from Stirling, 1941.

### Lepidoptera.

An outstanding feature was the abundance of the Large Cabbage White Butterfly, *Pieris brassicae*, L. The larvae of this species were, in one case, found feeding on the Canary Creeper at Glasgow, 10/7/40. Caterpillars of the Peacock Butterfly were on nettles at Drymen, 3/7/40.

*Hadena oleracea*, L. The Tomato Moth, Ayr, 16/4/40.

*Gortyna micacea*, Esp. The Rosy Rustic Moth, mining in potato shaws at Glasgow, 1940. Larvae attacking potatoes at Airdrie, Lanarkshire, at Renfrew and at Knightswood and Springburn, Glasgow—June–July, 1942.

*Plusia moneta*, F., the Golden Plusia on *Delphinium* at Dumbarton; cocoons, 13/6/40.

*Hyponomeuta cognatella*, Hb., one of the Small Ermines; larvae, pupae and web on *Euonymus* at Auchincruive, 2/7/40; larvae at Clarkston, Glasgow, 26/6/42.

*Agrotis exclamationis*, L., Heart and Dart; larvae attacking seedling onions and carrots, Kilmarnock, 8/8/40. Unusually abundant, 1941.

*Acherontia atropos*, L. Death's Head, caterpillar on potato at Ballantrae, 13/3/40, pupated 24/8/40.

Intensive cultivation of gardens, allotments and newly broken grasslands has drawn attention to many of the white underground caterpillars of the Swift Moth, *Hepialus*, spp., and to other soil larvae such as the

Turnip Moth, *Agrotis segetum*, Schiff.

Specimens of damaged apples from Buchlyvie were found to be attacked by the Tineoid Apple Fruit Miner, *Argyresthia conjugella*, Zell, which seems to be spreading.

## Diptera.

*Chortophila brassicae*, Bouché, the Cabbage Root Maggot, has been doing much damage to Cruciferous crops and the Carrot Rust Maggot, *Psila rosae*, Fab., to its own food plants.

*Theobaldia annulata*, T., the Ringed Mosquito or Gnat ; females were found hibernating in a house at Milngavie, 26/3/40.

*Pollenia rudis*, F., the Cluster Fly, which in the maggot stage is a parasite of Earthworms of the genus *Allolobophora*, was noted at Auchincruive on 25/3/40. Clusters of this fly, together with *Pyrellia cyanicolor*, Zett., were noted in a caravan on Loch Lomondside on 11/11/40.

*Hypocera carinifrons*, Zett., the Phorid Fly, parasitic on *Bibio* sp., larvae found in garden humus, Bearsden, 11/3/42 ; pupated 10/4/42 and flies emerged in July.

## Rhynchota.

*Psylla mali*, Schr., on apple trees, Broomhill, Glasgow, 3/6/42.

*Pemphigus bursarius*, L., on lettuce roots, Shawlands, Glasgow, 29/7/42.

*Megoura viciae*, Kalt., on beans, Cardonald, 31/7/42.

*Anuraphis padi*, L., on plums, Kilmarnock, 15/8/42.

*Aulacaspis (Diaspis) rosae*, Bouché, on roses, Blairmore, Argyllshire, 14/10/42.

### Geological Section.

When Mr. M'Lean demitted office as convener of the section he prepared and handed over to the Society's Library a volume containing a detailed record of the activities of the Geological Section during his convenership. This record extended from 1934 to 1939 inclusive and dealt with investigations carried out on many of the notable horizons around Glasgow. Surveys were also carried out over definite areas, viz. :—1935, The Kelvin Basin ; 1936 The White Cart Basin ; 1937, Strathendrick ; 1938, The Black Cart Drainage Area ; and 1939, The North Calder Basin.

The regional surveys were continued under the convenership of Mr. W. J. Cannon and the areas investigated were :—1941, The Western Slopes of the Kilpatrick Hills ; 1942, The Southern Slopes of the Kilpatricks and The Western Slopes of the Campsie Hills.

In 1941 particular attention was paid to Auchenreoch (Murroch) Glen. Here the shale and cementstone deposits were carefully studied and considered in the light of recent publications. Several interesting varieties of gypsum were obtained.

An excursion was also made to the Darnley area (16th December) to collect and study the fossils of the Arden Limestone.

In 1942, Auchentorlie Glen provided some interesting work. Here, "Two seams of coal are exposed a short distance from the entrance, and deserve recording in detail, representing as they do a serious contribution to our work."



“The first is 30 yards downstream from the bridge on the west bank of the stream and is  $2\frac{1}{2}$  feet thick dipping to the S.W. at  $30^{\circ}$ . The second is underneath the bridge, 3 feet thick, and dips at roughly  $25^{\circ}$  to the S.E. These beds of coal are probably part of the same seam and mark the location of a fault.

Fine grained basalt rests directly on the coal and is whitened at contact due to volatiles, released from the coal, which have carbonated the trap. The coal is little altered by the heat of the lava flow.

The rocks of Glen Arbuck are similar to those of Auchentorlie and are rich in minerals. On the 700 contour, in a green grassy slope below a crag of basalt (a faulted flow of the adjoining Haw Craig), is a 9-foot seam of coal. The appearance of the coal suggests heating and it contains nodules which appear to be of a better quality. Immediately above and below the coal are beds of a clayey carbonaceous shale. These bands were probably seat-earth and in the top one there are thin partings of a muddy coal.

An intensive study has been made of the coals.

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### Microscopical Section.

The past three years have seen an ever increasing activity in this section. There has been a considerable accession to its membership. In addition to the ordinary meetings of the Society regular monthly meetings have been conducted in the Royal Technical College. At

these meetings lectures, informal talks and demonstrations have been given and discussions thereat have been most helpful.

The "Goodfellow Lecture" of 1942, given by Mr. Gordon Rattray, Ph.C., and dealing with "Recent Advances in Plant Microscopy," gave a great impetus to the members of the section, who are also greatly indebted to Mr. Rattray for every facility in carrying out their microscopical investigations and for his advice regarding the technique of these investigations.

Several of the results of the work of this section have been shewn at the meetings of the Society, including the annual meeting of the Photographical Section. There has also been a linking up with the Entomological Section by the formation of a "Bee" sub-section whose leaders are Miss Woodland and Mr. J. C. Graham.

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### Ornithological Section.

The extremely cold weather at the beginning of 1940 caused a heavy mortality among our resident birds. Later, a two months spell of dry weather with cold winds tended to hold up nesting to some extent, but it had little effect on the migrants. The fine weather of the late spring and early summer meant a successful breeding season for most species. With the good autumn and a mild winter up to the end of December the year was as a whole a good one. The numbers of all our common birds tended to exceed the average numbers of the last few years.

The most interesting record of 1941 was the nesting

of the Fulmar in Ayrshire. (v. page 75). Another nesting report this year was that of the Sandwich Tern at Ballantrae. Mr. Wm. Jamieson found a nest with three eggs in June.

The weather of 1942 was exceptionally severe on bird life. The prolonged frosts of the first part of the year caused a heavy bird mortality among our resident birds. The Thrush family were the chief sufferers, but most of the smaller species were affected. Then the cold winds of the spring, continuing into June, had a marked effect on the arriving migrants. The Sedge Warbler in particular was practically absent from large parts of the Clyde Area. The nesting season being both cold and wet, and being followed by a wet summer, the nestlings, particularly those of ground nesting birds, must have had a high mortality.

The numbers of most species were therefore decidedly fewer than normal in the autumn, and only the open winter has saved them from further reduction.

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### Zoological Section.

Animal organisms other than insects noted in the Clyde Area included :—

#### Arachnida.

ACARINA (Mites).

*Bryobia* sp., a " Red Spider Mite " invading a dwelling house at Bearsden on 27/5/40.

*Eriophyes ribis* (Westr.), Nalapa, on Black Currants, Glasgow, 28/4/42.

*Aleurobuis farinae*, L., in American rolled oats stored in an institution in Lanarkshire, 6/7/42.

#### Myriapoda.

*Blanjulus guttatus*, Bosc., the Spotted Millepede, attacking potatoes at Milngavie, 20/8/40.

#### Nematoda.

*Aphelenchoides fragariae*, Ritzema Bos., Strawberry Eelworm in Cauliflower-diseased Strawberry plants from Torrance, 21/5/40.

*Heterodera schachtii*, Schmidt., the Potato Eelworm was reported to be reducing markedly the yield of potatoes in allotments in Glasgow, in 1940, and at Baillieston and Mount Vernon (Lanarkshire), Greenock and Johnstone (Renfrewshire) as well as in Glasgow, July-Sept., 1942.

*H. marioni*, Cornu., on Tomatoes, Drumchapel, Dunbartonshire, 7/9/42.

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### FROM THE SOCIETY EXCURSION REPORTS.

25TH MARCH, 1940—EXCURSION TO AUCHINCUIVE.

The Chiffchaff (*Phylloscopus collybita collybita*) was seen and heard several times during the day by various members. There were possibly two birds. This is an early date for the return of this rather rare summer migrant.

T. ROBERTSON.

---

13TH JULY, 1940—EXCURSION TO THE ARROCHAR DISTRICT.

“The only botanical item of special interest during the



day was the finding of the moss *Webera polymorpha*, Schp., on the roadside in Glen Douglas. This moss, though not exactly a rare one, has not been noticed in more than a few localities in our area. There was an old record of its having been found on the hillside above Loch Long near the head of Glen Douglas, but this was found to have been an error, the specimen on which the record was based was later discovered to be the much more common *W. nutans*, Hedw. It is therefore of some importance that we are now able to restore the record of *W. polymorpha* from this vicinity. The only botanical feature of the Fairies' Lake which attracted attention was the large spongy masses of *Aplozia cordifolia*, Dum., which gave an almost black appearance to the marshy edges of the lake."

JOHN R. LEE.



Beinn Laoigh.

## IN MEMORIAM.

Mr. Hugh Boyd Watt, F.Z.S., M.B.O.U.

By the death of Hugh Boyd Watt the Society has lost one of its Honorary Members. He was also an Original Member of the Andersonian Naturalists' Society and of the Scottish Mountaineering Club, and a Playing Member of the Queen's Park Association Football Club. In 1896 he joined the Glasgow Natural History Society.

While he was in Scotland Watt's chief researches were carried out on Birds and Mammals. He contributed the section on Mammalia to the British Association Handbook of the Natural History of Glasgow, 1901. But he was also keenly interested in Shrubs and Trees and wrote a series of notes to the *Glasgow Citizen* Nature Column which was then under the supervision of John Paterson.

The following is a list of his local publications :—

In the Transactions of the Natural History Society of Glasgow :—

Vol. v. (N.S.) 1896-99.

“Heronries, Past and Present, in the Clyde Faunal Area.”

Vol. vi. (N.S.) 1899-1902.

“A Census of Glasgow Rookeries.”

“The Seals, Whales and Dolphins of the Clyde Sea Area.”

Vol. vii. (N.S.) 1902-05.

“The land Mammals of the Clyde Faunal Area.”

In the Annals of the Andersonian Naturalists' Society :

Vol. I.

“The Return of the Swallow.”

Vol. II.

“Scottish Forests and Woodlands in Early Historic Times.”

“The Natural History of Ailsa Craig.”

This last paper was joint with John Smith and John Paterson. In it, commenting on the line from “Duncan Gray,”

“Meg was deaf as Ailsa Craig,”

Watt calls it “a piece of modern tautology, probably due to Burns. At least I have found no earlier mention of the name Ailsa Craig.” It had previously been known as Ailsa.

Hugh Boyd Watt went to London. There his interests in Biology were maintained and we heard of him as a member of the Selborne Society, of the South-Eastern Union of Scientific Societies and of the British Ornithological Union. He also held office in the Ecological Society. He was a Fellow of the Zoological Society. But, although far from his Scottish haunts, his membership of the Glasgow and Andersonian Natural History and Microscopical Society was always a source of pleasure and interest to him, and he used to recall early days when he had been able to take an active part in it.

Hugh Boyd Watt died at Bournemouth, Hants., on the 17th February, 1941, after a long illness. Like his friend Alexander Ross he was an octogenarian. He was the son of the late John Hugh Watt, Shipowner, Glasgow. In business he was an Underwriter. He was a man of fine physique and a good naturalist.

A. SHANKS.

### Mr. Thomas McGrouther, F.S.A. (Scot.)

Thomas McGrouther was born in Grahamston, Falkirk, in August, 1858, and died at Larbert on 2nd July, 1941. At the age of 14 he started work in Allan the Writer's office. Whilst studying Law at the University he gained 1st prize in Conveyancing and 2nd prize in Scots Law. In 1893 he came to Glasgow to work with Messrs. McBride, McArthur & Stevenson, Writers, and became a partner in this firm in 1910.

His chief interests lay in Archaeology, Botany and Chess, and he played Golf.

Mr. McGrouther first became interested in Botany about 1903 when he accompanied a teacher friend to a class conducted by the late Prof. Ellis. From that time he became a keen botanist and pursued his hobby when on holiday at Biggar, Newtonmore and—that spot dear to all Alpine botanists—Lawers. He was President of the Falkirk Natural History and Archaeological Society for 12 years and was an authority on the local Flora.

Mr. McGrouther's chief interest was Archaeology. It began when his uncle took him as a boy to Rough Castle on the Roman Wall. Roman Remains had a fascination for him, and he had much correspondence with the late Sir George Macdonald. He was elected a Fellow of the Society of Antiquarians (F.S.A.(Scot.)) about 1926. His writings, published by his local society, included "The Bruces of Airth," "Airth Problems," "The Origin of the Falkirk Trysts," "The Meaning of the Inscription on the Window-Sill of the Old Masonic Buildings in Silver Row, Falkirk."



He was Chairman of Larbert Library Committee for 10 years until the Library was taken over by the County in 1930, and to it he gifted many of his books of local interest.

J. C. McGROUTHER.





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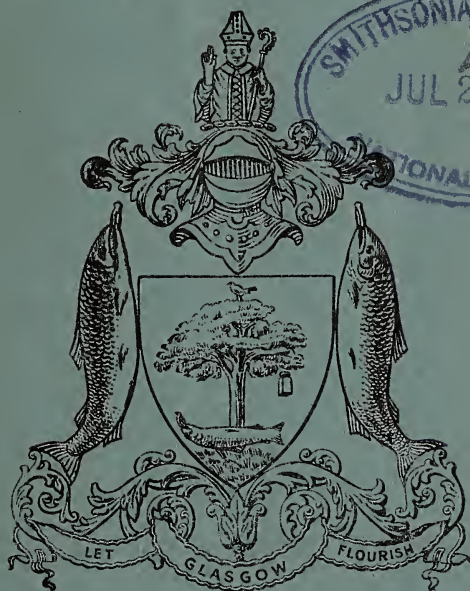
# The Glasgow Naturalist

THE JOURNAL OF THE  
GLASGOW AND ANDERSONIAN NATURAL HISTORY  
AND MICROSCOPICAL SOCIETY

(Including the *Transactions and Proceedings* of the Society)

Vol. XIV.  
Part III.

1944



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## SUMMARY OF CONTENTS

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|  |      |
|--|------|
| PAPERS—  | PAGE |
| Possil Marsh—A Retrospect . . . . .                        | 105  |
| William Rennie.  |      |
| Coal Seams of Auchentorlie and Arbuck Glens . . . . .      | 118  |
| William J. Cannon.   |      |
| Return of Summer Birds to the Clyde Area in 1943 . . . . . | 120  |
| Thomas Robertson.  |      |
| DIGEST OF THE PROCEEDINGS OF THE SOCIETY . . . . .         | 122  |
| FROM THE SECTIONAL REPORTS . . . . .                       | 129  |
| INDEX . . . . .  | 131  |

# The Glasgow Naturalist

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Vol. XIV. Part III.]

[September, 1944.]

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## POSSIL MARSH—A RETROSPECT.

By WILLIAM RENNIE.

Delivered 12th October, 1943.

Two questions are often asked : “ Where is Possil Marsh ? ” and “ What was its origin ? ”

The first is easily answered. The marsh lies within three miles of the Royal Exchange, north-west of the City. Across the canal at Lambhill car terminus, it is the triangular piece of ground on one's right hand, lying between Balmore Road and the canal. But the questions as to its origin and what has led up to its present condition open up a wide problem. I think one may safely say it is the result of mineral workings combined with climatic and other causes. I will try to give reasons later to justify my views.

Until within comparatively recent years Possil Loch, to give it its proper name, appears on the Post Office map as being “ Dry in Summer.” Lambhill Cottage (demolished prior to 1894) also marked on the old maps was used by the gardener and coachman of Grahame of Possil.

To the man of to-day the origin of the Marsh is wrapped in

mystery. Personally I have not had access to private papers, but by deduction from what has appeared in print, from local lore and from what is presented to our eyes to-day, we may conjure up a picture of what things may have been like in the distant past.

I believe the view is accepted that at one time this area formed part of the extreme western boundary of what was the Bishop's Wood or Moss, and was cut off from the stretch of flat bogland lying to the east by the formation of the Forth and Clyde Canal. Work on this began in the east in 1768, and by 1775 the canal was fit for navigation as far as Stockenfield which lies a short distance west of the marsh. In 1790 the canal was open to Bowling, so completing the waterway from east to west.

" . . . It would be interesting to be able to settle definitely how much of the flora of the marsh has been affected by the formation of the Forth and Clyde Canal ; but of course that can only be guessed at. There is every reason to suppose that new plants would appear in it after the canal brought it into connection with the eastern district."<sup>1</sup> Two illustrations :—

" . . . He (Hopkirk) records *Lysimachia thyrsiflora*, on the authority of Smith's Flora Britannica 1800, 'on the edge of a lake to the north of Glasgow.' I (Turner) think there can be little doubt that the lake meant is Possil Marsh which lies to the north of Glasgow and along the edges of which the Tufted Loosestrife still abounds (1885). It does not appear to occur in any of the waters properly called lakes near Glasgow. It was probably introduced into Possil Marsh through the medium of the canal in which it is profuse."<sup>1</sup>

Turner (1885), when writing of *Ranunculus Lingua*, the Greater Spearwort, says, " . . . This conspicuous plant, though rare in Clydesdale generally, is now abundant in Possil

Marsh. I can hardly conceive that Hopkirk could have omitted it had it grown in the marsh—I think we must assume that it has been introduced there through the medium of the canal, and this opinion is strengthened by what Patrick says of it in 1831, ‘By the banks of the great canal near Stockenfield.’ Even then though found in the canal near the marsh Patrick says nothing of its occurrence in the latter station. The presumption is clear that it subsequently found its way into the marsh—and I may add—that this is besides the only station for the plant in Henedy’s Clydesdale Flora, 1865.”<sup>1</sup>

Let us try and piece together the information gathered. It is from the botanical side we gain our first step. References are to be found in Smith’s Flora Britannica, 1800, Hopkirk’s Flora Glottiana, 1813, Patrick’s Flora of Lanarkshire, 1831, and Henedy’s Clydesdale Flora, 1865.

“ . . . Hopkirk’s Flora Glottiana published in 1813 was the first catalogue of plants of the Clyde district, and, indeed, one of the earliest local floras in this country.”<sup>1</sup> Possil Marsh is often referred to in his book as “the marsh beyond Possil.” Without entering into details, let one item suffice: *Utricularia vulgaris* he chronicles as growing “in a deep hole in the marsh—Possil.” (Less than forty years from the time the canal was cut.)

Patrick, when referring to plants occurring at the marsh, uses the same place description as Hopkirk, with one exception when he refers to “*Salix Petiolaris*, Long-leaved Willow. Possil Marsh—North side of the Canal.” Patrick seems to have been the first to use the term “Possil Marsh,” a name by which the place has become widely known. Some of the plants mentioned by Henedy in 1865 as occurring at the marsh are now non-existent.

Our next source of enlightenment comes from Ornithology. James S. Dixon in “The Birds frequenting Possil Marsh,”



1871, gives us our first details regarding the bird life and altering conditions.

“ . . . from the encroachments that are yearly made upon its area, and still more from the increasing population in its vicinity, through the establishment of numerous public works, it is being gradually deserted by the more shy species, and I am afraid the more pertinacious ones will soon be driven off.”<sup>2</sup>

Robert Gray, in “ Birds of West of Scotland,” 1871, commenting on the Little Grebe says: “Things are a bit changed now from Mr. Dixon’s time when he was able to find about a dozen nests in one day.”

The following, also from “ Gray’s Birds,” is of more than passing interest : “ In the neighbourhood of Glasgow the Little Grebe is found nesting in Possil Marsh and also at Hogganfield Loch. Sixteen nests were found in the first mentioned locality in the breeding season of 1868, many of them by my friends Messrs. W. Lorrain and J. S. Dixon whose persevering skill has been the means of revealing the comparative number of birds breeding in that rapidly decreasing marsh.”

“ On the Birds of Glasgow and its Vicinity ”<sup>3</sup> Robert Gray in 1876 referred to the great changes that were coming over the bird nurseries around the city and expressed the fear that in another thirty years all would be gone.

Let us examine the evidence of four individuals as recorded at the time in my journals. I use the noms-de-plume “ Black,” “ White,” “ Brown ” and “ Green ” out of consideration for their descendants.

In 1894 Mr. Black, an old residenter in the locality and well advanced in years, stated that the marsh was increasing in size ; he remembered how, as a boy, after long spells of dry weather he wandered about freely amongst the tall grass that grew towards the shaft where water is to-day, and now many, if not all, of the hard beaten tracks are lost in the soft mud,

In 1905 Mr. White, who also was well advanced in years and had lived nearly all his days in the immediate neighbourhood, related how, after spells of dry weather, you could make your way right up to the "pit shafts"; there were a few rather nasty deep spots but when you knew them you avoided them. When the marsh was in flood the place was really dangerous. That was many years ago, ere it had reached its present size. Away back in those early days all the big scientists used to come out here. It was also one of the finest Snipe localities known.

In 1915 Mr. Brown, an old residenter whose parents came to the district when he was a very young boy, remembered how as a lad he could walk all over the marsh, the little that was of it was so firm. There was an ironstone pit with two shafts; speaking from memory, they were from 15 to 25 fathoms deep; about 52 or 53 years ago the water from the canal broke in on the workings.

In 1915 Mr. Green, a regular visitor to the marsh, stated that he had been going about the marsh since he was a boy of 7 years. He was 71 now, so making 64 years' association with the place, and "it is the same now as it was 64 years ago and there never was a pit or anything else working at the marsh during that time."

#### SUMMARY.

Hopkirk availed himself of the use of Lightfoot's "Flora Scotica," 1777. Possil is not included in his localities. Accepting Smith's reference to the "lake" north of Glasgow as meaning Possil Marsh, this gives us our first stepping-off point. The evidence of there having been a pit or other workings is that it had been in existence prior to 1813. As to the nature or extent of the marsh nothing is forthcoming till 1868, when it was possible to find a dozen nests of the Little

Grebe in one day, or sixteen nests in the course of one breeding season. For that to have been possible one would naturally expect that the area under water would be fairly large. This is borne out by Smith's allusion to the "lake." Assuming that to be so, a change must have been taking place about that period for we find Gray in 1871 writing about "that rapidly decreasing marsh" and again in 1876 he refers to the vanishing bird nurseries around the City.

The contributions from Messrs. "Black," "White," "Brown" and "Green" leave us still in a state of haze. From "Black," "White" and "Brown," who support the views held by Dixon and Gray, one can see some light as to the reason why the early maps give "Possil Loch dry in summer." "Brown" and "Green" would each be about the place from the same period, yet they differ. "Black" and "White" were earlier. "Green's" views, so far as surface water is concerned, are not in accordance with those of Dixon, Gray or the other contributors. From what I gathered from other sources, workings during that time were non-existent. "Brown's" reference to the pit does not help us; according to his version of the break-in the date would be placed about 1863, whilst the "hole in the marsh" regarded as the old shaft had been in existence more than fifty years prior to that date. His details of the pit I regarded at the time as a handed-on story as I had heard it told several times, varying from one to two shafts.

In 1871 Robert Gray writes "rapidly decreasing marsh." Twenty-three years later "Black" (1894) says "increasing marsh"; and according to "Green" the marsh was the same in 1915 as in 1851, twenty years prior to Gray writing about the decrease.

I have every confidence that what was conveyed to me was given with all sincerity and truthfulness. Still, I have always



a feeling that too much reliance should not be placed upon the memories of old people when dealing with early history.

I think it not unreasonable to assume that a pit had been working sometime during the eighteenth century and, through an inrush of water destroying the workings, Smith's "lake" was brought into being.

If the water was decreasing in 1871, where did it go? There are no signs to-day to show how it could escape. It has been suggested that it made its way into older workings.

In conclusion I remain faced with the vital question still unsolved: "Does the marsh date from the close of the eighteenth century, the result of a pit disaster?"

To-day, what one would really like to know is, "At what period did the marsh again begin to increase its water surface, and what was the cause?" If there was no pit, how comes the shaft or the deep hole referred to? The evidence of workings left above ground lies before our eyes, whilst much debris is now under water.

As to the break-in. From information culled many years ago whilst conversing with the old mining fraternity, it seems to have been the workings from an old mine on the reverse side of the canal that caved in, and not the canal. This happened one Sunday morning. No lives were lost but the miners lost their graith and everything else still lies below. This traditional story is still in vogue at the present day. There are several old workings in the immediate vicinity and it has been suggested that the pit in question may have been one of the group of Ironstone pits wrought by the Carron Co. The Milton Estate Office, on whose ground the workings are, may be able to give enlightenment on the matter.

Many years have passed since the first reference to the "Hole in the Marsh." As recently as 1911 it was found; although not plumbed to a bearing, a fair depth could be



attained. A steady light flow of water continues to come from the "hole."

Local talk : After the disaster an attempt had been made to drain off the flooding by constructing a brick conduit that would lead the water into West Possil Loch, or what is locally called Lochburnie.

Examples : " A bricked archway has been located at a fair depth near the top of the ridge of grazing field, west side of Balmore Road." Again, " a bricked tunnel at no great depth from the surface has been found in the Western Necropolis." These are said to have been part of the tunnel referred to. No one to whom I have spoken has ever seen these arches ; it was always a case of the old story of somebody telling some other one. But why take the water to Lochburnie ? At that time Lochburnie would have difficulties enough in getting rid of existing surplus water. Years ago, during discussion (for the origin of the marsh was a never-ending topic), one of the coterie summed up the case briefly : " These alleged drainage tunnels are stories of ' bunk.' There are only a few feet of fall between the two lochs ; had anything been attempted the route would have been south-west, not due west. Look at the map and think it over." If there is any truth in the story about the canal being the cause of the flooding, tunnelling to Lochburnie would be a case of emptying the canal, a project that would be ruled out. It has been suggested that the brick work, if it does exist, is that belonging to old workings.

Glasgow Corporation Water Department acquired the strip of ground running along the east side of Balmore Road, to the extent of fourteen yards broad, as part of the Wayleave for their pipes. This necessitated the cutting down of a strip of deciduous trees, which has not only robbed the marsh of its sylvan beauty but has left it exposed to the rigours of the south-west gales. The first cutting of the trees took place in

1894. After further cutting in 1912 all that now remains is a single Beech tree and some Hawthorn bush.

Extract : 7th December, 1913. " I asked Mr. Aitkenhead of Lochfauld if he had ever seen the marsh dry in summer, and he replied, ' No, never.' He had seen them cutting hay from the western side, but it had always to be carried out. That is impossible now, and he gave me the following as the reason. Some years ago the surface of the canal was raised some four inches, by increasing the height of the overflows. The result is that the surface area of the marsh is greater, rendering the lower part of his field sodden through the choking up of the drains." Although I made no entries in my journal at the time of the undertaking I remember the carrying out of the work at Cadder. I passed the remark to one of the workmen about the extra weight of water on the lock-gates, banks, etc. He said they could stand a good bit more. It was several years before the effects of the wash-back was noticeable on the marsh. Proof : prior to this change, the water from the marsh fell from the overflow into the canal from a height of a few inches. To-day the overflow stone is still in the same position, but submerged.

Mr. James Knox, Gourock, whose father had a lease from Grahame of Possil of the part of the marsh alluded to, corroborates Mr. Aitkenhead's statement regarding the carrying out of the hay, and adds that crops of corn and potatoes were also grown. In the early 'seventies his father built Knox's Cottage and started dairy farming. Owing to the introduction of new Dairy Regulations about 1893 he switched over to pig-feeding. The work was carried on till 1904. Afterwards the buildings were used by different tenants. The last of these buildings was demolished prior to 1930 ; all that remains to-day is the hard ground at 1030 Balmore Road.

Unsuccessful attempts were made by the Sanctuary Trust to clear the Boundary Ditch so as to enable the water to flow into the canal instead of spreading over what was at that time firm ground. It was ascertained from an expert ditcher that the condition of the ditch was due to the level of the ground being lower than that of the canal into which the water should drain.<sup>4</sup> The making of a new cutting at the northern end has enabled the water to flow directly into the loch instead of flooding the ditch.

(Up till a little over forty years ago the "Roaring Game" used to be played at the marsh by members of the City Saw Mill Curling Club.)

My connection with the marsh dates from childhood days. The change most apparent to the eye to-day is the great increase in the surface of water ; much of the area that is now water I can remember as firm green field and shrub. The cause of change I attribute to two factors :

(1) Cutting down of the trees.

(2) Raising depth of the canal.

The greatest evidence of surface expansion is along the eastern borders, which I think may be attributed to erosion caused chiefly by the south-west gales. This corner, being of a peaty nature, has during the last forty years suffered badly from flooding, so much so that the flora is changing ; there, heather and associate moorland plants used to grow, but these are now being ousted by *Phragmites* and such-like plants. The track of raised ground parallel with the canal is chiefly the accumulation of canal dredgings and, being of a more solid nature, has resisted erosion ; submergence takes place from the foot of the slope. The side which lies alongside Balmore Road has not increased its water face to any great extent, but what has taken place is that it is gradually becoming a muddy



swamp of lush grass. I maintain that this is due to the retention of water that used to escape into the canal. The southern part, from the nature of the vegetation—chiefly *Typha*—shows less surface water, but there is an extensive increase of swamp in which the bogbean is beginning to make its presence known, especially towards the margin.

Extract: 10th August, 1919. “Conversing with Mr. Aitkenhead of Lochfauld. He mentioned that, when he came to Lochfauld in 1877, what I term north and east willows used to be potato beds belonging to the miners. They were what is popularly known as “Lazy-beds”; they seemed to have suffered badly from rats. At that time the miners were making good money, so the potato beds were allowed to fall into disuse and in their place willows grew up. The formation of the beds has almost completely disappeared, through the ground becoming bogged and the changing vegetation.”

(North—Willows. East—Willows, Birch, Rowan, Hawthorn, Bramble.)

John Aitkenhead was tenant of Lochfauld Farm from 1877 to 1925. He took a keen interest in wild nature, especially that associated with the marsh, and was one of those who advocated that Possil Marsh should be acquired as a Sanctuary.

Evidence of there having been a pit or other workings is shown by what was left above ground (namely, shale and blaes), and which is now level with the surroundings or submerged. A narrow track exists between the Boundary Ditch (already referred to), which ceases to function now, and the loch; this runs from the shale to the canal. This path was spoken of as the old tramway or bogie line that carried the material to the canal. Be what it may, the track has until recently given a fairly firm footing but part of it is now fast becoming bog. Some years ago the path was greatly



strengthened and the ground levelled by a Gun Club which for several years made use of this part of the marsh.

During one of the big coal strikes the shale was opened up and some of it taken away to be used "as a means towards an end." In one of the openings water gathered to a depth of a few inches, and here appeared a plant of *Chara* and two plants of Mare's Tail (*Hippuris vulgaris*). One wonders how long their fruits had lain buried! They held their own for some considerable time; then the surface of the water became coated with Green Algae and the opening gradually filled up.

A desire was expressed by those interested in Nature that, before it was too late, Possil Marsh should be acquired. The necessary steps towards that end were taken. The proprietors of the marsh having been approached, two out of the three agreed to lease their rights of the marsh to Trustees in order that it might be retained as a Bird Sanctuary. The Trustees acting on behalf of the third party sold their ground to the Trust.

The area of Possil Loch, including land and water, is some 70 acres, and has since 1930 been under "The Scottish Wild Bird Sanctuary Trust."

There seems to have been ruthless destruction from early times. In the early 'seventies a desire for more thorough protection for this unique spot was expressed.<sup>5</sup> The proprietors of the marsh were able to put a check to much of the depredation that was being wrought, but their efforts gradually lost effect—so that before the marsh was acquired by the Trust much destruction had taken place. Possil Marsh was outwith the City until 1926.

In 1937, on the strength of my long association with the place and basing my outlook since the introduction of the Glasgow Bird Protection Order, 1925, I made reference to a new bird epoch that was in course of formation.<sup>6</sup> This is

materialising, but whether for "weal or woe" is all as we view the change.

The unrecorded changes that have taken place in the field of nature since these early days must be many and varied. What may seem a small, trivial thing to-day may be an important piece of evidence in later years.

The erection in the immediate neighbourhood of the extensive Housing Schemes contemplated by Glasgow Corporation may not augur well for the Sanctuary. Let us be sufficiently optimistic to hope that adverse conditions will not set in for many years to come.

This fragmentary Retrospect is placed before you to record collectively what is known, with the desire for more enlightenment regarding a place so dear to naturalists.

<sup>1</sup> Thomas Hopkirk of Dalbeth. By Robert Turner. *Proc. Nat. Hist. Soc. Glasgow*. Vol. I, N.S.

<sup>2</sup> *Proc. Nat. Hist. Soc. Glasgow*, Vol. II.

<sup>3</sup> "British Association: "On the Fauna and Flora of the West of Scotland," 1876.

<sup>4</sup> The Scottish Wild Bird Sanctuaries Trust, Report for 1934.

<sup>5</sup> *Proc. Nat. Hist. Soc. Glasgow*, Vol. II, page 253.

<sup>6</sup> The Glasgow Naturalist, Vol. XIII.



Bog Cotton.

## COAL SEAMS OF THE AUCHENTORLIE AND ARBUCK GLENS.

Contributed by Mr. W. J. CANNON in the Annual Report of  
the Geological Section for the year 1943.

A general description of the coal seams found in the Auchentorlie and Arbusk Glens is given on pp. 93-94 of this volume, and it is stated that an extensive study had been made of them. The result (to date) of this study can now be published. Before this is done, however, the existence of a bed of brown lignite at the head of Auchentorlie Glen just above and to the west of the double waterfall remains to be recorded.

This lignite and the coals have been analysed with the following results :—

| SPECIMENS                     | DRY            |                 |      |                        | DRY, ASH FREE  |                 |                        |
|-------------------------------|----------------|-----------------|------|------------------------|----------------|-----------------|------------------------|
|                               | Vola-<br>tiles | Fixed<br>Carbon | Ash  | Gross<br>cv.<br>B.T.U. | Vola-<br>tiles | Fixed<br>Carbon | Gross<br>cv.<br>B.T.U. |
| Auchentorlie No. 1 -          | 13.7           | 31.1            | 55.2 | 5880                   | 30.6           | 69.4            | 13130                  |
| Auchentorlie No. 2 -          | 14.1           | 30.9            | 55.0 | 6230                   | 31.3           | 68.7            | 13840                  |
| Glen Arbusk - -               | 12.7           | 29.8            | 57.5 | 5510                   | 29.9           | 70.1            | 12910                  |
| AVERAGE - -                   | 13.5           | 30.6            | 55.9 | 5873                   | 30.6           | 69.4            | 13293                  |
| LIGNITE (BROWN<br>SHALES) - - | 9.2            | 8.1             | 82.7 | —                      | 53.2           | 46.8            | —                      |

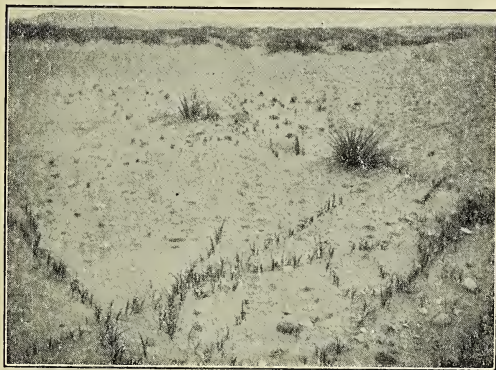
It will be seen that the coals are impure in the sense that they contain 56 per cent. of ash, but that when calculated on the "ash-free" basis (a usual modern way of comparing coals) there is a normal amount of volatiles, and on Seyler's Chart they fall within the range of sub-hydrous meta-lignitous, or coals of "low rank." It must be borne in mind, however, that the specimens analysed were taken from the surface and



have been subjected to considerable weathering.

The amount of deterioration has been assessed at about 1/7th in the case of the Auchentorlie coals and about 1/6th for the Glen Arbuck. The coals were originally (before weathering, but after burial) probably about 15,500 B.T.U. gross calorific value, with volatiles over 30 per cent., on the "ash-free" basis. This would place these coals in Seyler's ortho-hydrous ortho-bituminous class, i.e., absolutely normal bituminous coals.

The brown shale from the head of Auchentorlie was also tested with the result as shown in the table above. On the "ash-free" basis it will be observed that the volatiles/carbon ratio is 1.14, thus showing the characteristic necessary for classification as a lignite. Although very "impure" on account of the high percentage of non-combustible material (ash), the figure of 1.14 agrees closely with the well-known and commercially worked deposits of brown lignite.



Sand Sedge.



## RETURN OF SUMMER BIRDS TO THE CLYDE AREA.

Compiled by THOMAS ROBERTSON.

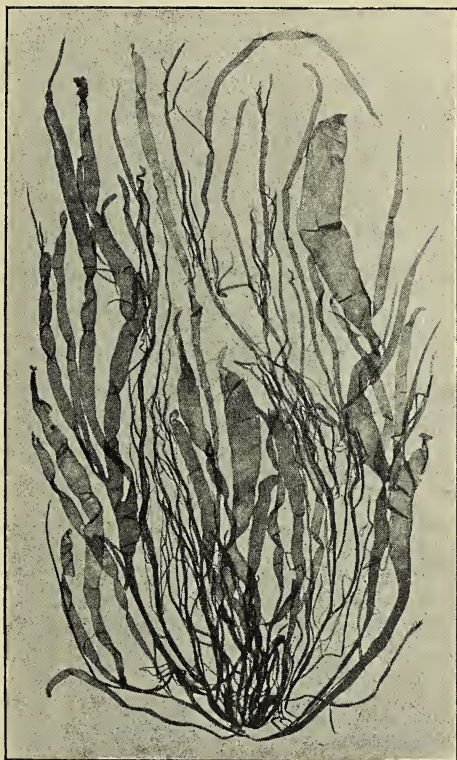
1943

|         |                          |                 |         |
|---------|--------------------------|-----------------|---------|
| Feb. 14 | Lesser Black-backed Gull | Kilmacolm       | Mar. 13 |
| Mar. 17 | Wheatear                 | Carmichael,     |         |
|         |                          | Lanarkshire     | Mar. 28 |
| ,, 27   | Chiffchaff               | Ballantrae      | Apr. 11 |
| Apr. 7  | Sand Martin              | Motherwell      | Apr. 9  |
| ,, 7    | Swallow                  | Southend,       |         |
|         |                          | Kintyre         | Apr. 10 |
| ,, 10   | White Wagtail            | Largs           | Mar. 27 |
| ,, 14   | Willow Wren              | Southend,       |         |
|         |                          | Kintyre and     |         |
|         |                          | Motherwell      | Apr. 14 |
| ,, 14   | House Martin             | Dalry           | Apr. 23 |
| ,, 15   | Cuckoo                   | Dalry and       |         |
|         |                          | Torrance        | Apr. 23 |
| ,, 16   | Common Sandpiper         | Southend,       |         |
|         |                          | Kintyre         | Apr. 14 |
| ,, 17   | Corncrake                | Southend,       |         |
|         |                          | Kintyre         | Apr. 24 |
| ,, 21   | Yellow Wagtail           | Motherwell      | Apr. 21 |
| ,, 23   | Tree Pipit               | Bearsden        | Apr. 23 |
| ,, 29   | Whinchat                 | Southend,       |         |
|         |                          | Kintyre         | Apr. 28 |
| ,, 29   | Redstart                 | Balloch         | Apr. 27 |
| ,, 29   | Sedge Warbler            | Southend,       |         |
|         |                          | Kintyre         | May 3   |
| May 2   | Common Whitethroat       | Bearsden and    |         |
|         |                          | Bothwell Castle | May 2   |
| ,, 4    | Swift                    | Motherwell      | May 1   |

|       |                    |                 |        |
|-------|--------------------|-----------------|--------|
| May 5 | Common Tern        | Possil Marsh    | May 9  |
| „ 16  | Garden Warbler     | Bothwell Castle | May 9  |
| „ 16  | Spotted Flycatcher | Southend,       |        |
|       |                    | Kintyre and     |        |
|       |                    | Torrance        | May 10 |
| „ 19  | Wood Wren          | Loch Fad, Bute  | May 1  |

The last column indicates the average date over 25 years.

Compared with last year's list, 13 species were earlier this year and 9 were later in arriving. In comparison with the average dates shown above, 10 species arrived before their due date, 4 came on the exact day and 8 were later.



*Enteromorpha compressa.*

## DIGEST OF THE PROCEEDINGS OF THE SOCIETY.

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12TH JANUARY, 1943.

The first meeting of the Thirteenth Session was held, the President, Mr. John G. Cree, in the chair.

It was intimated that the report on the work done by the Geological Section for the past three years had been bound and was lodged in the Society's Library.

The Photographical Section gave its annual exhibition of lantern slides and films. This included a series of microphotographic films by Mr. W. M. Pettigrew, recording some very interesting researches which he had made on the life-histories of *Daphnia* and *Cyclops*. These films also contained some valuable items in the life cycles of other aquatic organisms. Mr. Pettigrew also showed a series of films, in colour, taken at the Edinburgh Zoological Gardens, in which, in addition to outdoor life, there were some beautiful studies of the fishes of the Aquarium. Mr. Cree exhibited a series of 30 microphotographs of various forms of plant and animal life. Dr. Cameron, using the epidiascope, displayed a Christmas Card depicting an oriental figure accompanied by a small deer. The latter led to an interesting discussion as to its species. By comparing the pictorial deer with illustrations of natural species, also shown on the screen, Dr. Cameron was able to establish that the design was of Chinese and not of Japanese origin.

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9TH FEBRUARY, 1943.

The Annual Business Meeting of the Society was held, Mr. J. Duncan Leslie presiding.

The following new members were admitted :—Mr. Allan R. Grant, 11 Stow Street, Paisley ; Mr. John W. Haythorn, 32

Elinore Avenue, S.4 ; Mr. Leo F. Poynting, 160 Killearn Street, N. ; Mr. Robert M. White, A.R.P.S., 125 Shawmoss Road, S.1.

The Reports of the Society's activities were read and approved. The following new office-bearers were elected :—President, Mr. J. Duncan Leslie ; Vice-President, Professor Hindle, F.R.S. ; Members of Council, Messrs. Wm. Jamieson, Wm. M'Intyre, H. Osborne. Mr. Robert Gray was elected Convener of the Photographical Section in place of Mr. Leslie and the vacancy in the Council was filled by Mr. J. T. Smith.

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#### 9TH MARCH, 1943.

The following new members were admitted :—Mr. Robert Macgregor, 4 Auldhouse Avenue, S.3 ; Mr. John Stewart, c/o Simpson, 8 Dolphin Road, S.1 ; Mr. Ernest W. R. Stollery, 51 Allison Street, S.2 ; Miss Margaret A. Mackenzie, M.P.S., c/o Hall, 19 Lindsay Drive, W.2.

Mr. Richard Elmhirst, F.L.S., Director of the Marine Biological Station, Millport, contributed "A Winter Diary—December, 1941 - February, 1943." In it he combined a naturalist's outlook with professional activities. An interesting description of the local ecology was given in which the influence of the mildness of the winter was stressed and in which the unnatural conditions obtaining in the Clyde Area upon wild, especially bird-, life was commented upon. Mr. Elmhirst outlined some of the valuable work being done at the Station, including an account of the use of *Gigartina stellata* (Pipweed) as a source of Agar. The lecture was illustrated by a large number of exhibits both plant and animal.

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#### 12TH APRIL, 1943.

The following were admitted to membership :—Mr. J. Harrison Maxwell, M.A., F.S.A. (Scot.), 21 Tay Crescent, E.1 ;



Mr. D. Sime, 80 Great Western Road, C.3 ; Mr. D. Stanley Dickson, LL.B., 137 St. Vincent Street, C.2.

Mr. H. C. Wilson gave an interesting talk on "The Use of Filters in Photography," which was illustrated by many illuminating experiments.

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10TH MAY, 1943.

Mr. Roderick S. F. Campbell, 32 Eastercraigs, E.1 and Mr. R. P. Skase, Lower Northend Farm, Batheaston, Bath, were elected members.

This meeting was devoted to exhibits of the work and methods of the various sections of the Society.

Collections of plant specimens were shown by Messrs. Lee, Shanks, Prasher and Gavin Paterson. These included *Trollius europæus*, Linn., *Ornithopus perpusillus*, Linn. and *Valerianella olitoria*, Moench. Mr. R. P. Skase exhibited photographs of flowers and ferns from the Bristol district. Miss Jean Craig had an interesting exhibit illustrating the germination of spores of *Polypodium vulgare*, Linn.

Mr. Cannon exhibited rock specimens from Auchentorlie Glen, Glen Arbuck and Ballagan Glen, and showed several photographs of general geological interest taken in the Kilpatrick Hills. Miss Jean Craig showed specimens and slides to illustrate rock and mineral structures. Mr. Stollery contributed Jasper from Ballagan Glen, Stilbite and Native Copper, also a section of a pearl from a Mussel taken at Girvan.

Mr. White exhibited slides and micrographs of Diatoms. Mr. G. Maclean and Mr. Rattray showed photomicrographs of botanical specimens.

Mr. Rennie had an exhibit indicating the nature of the food of the Tawny Owl, as revealed by the pellets, :—

Ruchill Park, East side, December, 1942. Diet—entirely

rats and field mice. January, 1943. Diet—Sparrow, Black-bird, Chaffinch, Starling. A graph was shown to illustrate the nesting of Rooks at Kenmuir Home Park, Bishopbriggs from 1912-43. Mr. Robertson contributed lists of the first arrivals of Summer Birds in the Clyde Area over a number of years. A display of bird photography was given by Mr. Gray.

The President, Mr. J. Duncan Leslie, announcing the death, on 15th April, of the late President, Mr. John G. Cree, said :—

With the passing of John Gault Cree the Society has lost not only a naturalist of great ability but a very esteemed friend. He and I were friends for nearly forty years and I along with many others was indebted to him for many acts of kindness. No trouble was too great for him if it meant helping someone and, although at first he seemed a bit reserved and inclined to keep in the background, he was one of the first to come forward with practical assistance when the necessity arose. He had a wide knowledge of Natural Science in general but so far as I know did not specialise in any particular branch. If he had any preference I should say it was for Microscopy. His photomicrographs, especially those in colour, were outstanding examples of patience and technique. Whenever there was a shortage of exhibits for the photographic night, J. G. C. was always ready to step into the breach.

He took an active part in the Microscopical Society before the amalgamation and I believe he was also an enthusiastic member of the Buteshire Society.

John Gault Cree will be an honoured name in this Society for many years to come.

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14TH JUNE, 1943.

The following new members were elected :—Miss Margaret W. Jepps, M.A., D.Sc., Department of Zoology, University of

Glasgow ; Mr. John Boyd, 2 Nelson Street, Largs ; Mr. John H. Jones, 941 Sauchiehall Street, C.3 ; Mr. G. T. Mowat, F.R.C.S., 10 Park Circus, C.3 ; Mr. Victor M. Syme, 41 Maxwell Avenue, Westerton ; Mr. Harry Wilson, An Taigh, Cyprus Avenue, Johnstone.

Mr. Thomas Robertson submitted a list of the first arrivals of Summer Birds in the Clyde Area in 1943, compiled by members and friends. (v. page 120). About sixty species of birds were illustrated by lantern. Mr. Gray exhibited a collection of bird photographs and Mrs. MacLelland showed some water-colour drawings of birds.

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#### 21ST SEPTEMBER, 1943.

The following new members were admitted :—Miss A. D. H. Dunnachie, M.A., 1773 Shettleston Road, E.2 ; Miss Agnes Gibb, M.A., 24 Keir Street, S.1 ; Mr. Joseph H. Bull, M.Sc., 10 Greenhead Road, Bearsden ; Mr. E. K. Cozens, 58 South Mains Road, Milngavie ; Mr. Charles H. Drewell, 78 Fergus Drive, N.W. ; Mr. T. H. M. Gordon, 61 Croftmount Avenue, S.4.

The President announced that Professor Hindle, F.R.S., Vice-President of the Society, had been appointed Scientific Director of the Zoological Society of London.

Professor W. A. F. Balfour-Browne delivered a lecture entitled "The Domestic Affairs of Caterpillars." The lecture was illustrated by lantern slides.

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#### 12TH OCTOBER, 1943.

Mr. Robert F. Whyte, 53 Craw Road, Paisley, was elected member of the Society.

Mr. William Rennie read a paper on "Possil Marsh—A Retrospect." (v. page 105.)

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## 9TH NOVEMBER, 1943.

The following new members were elected :—Mrs. Mary T. Stollery, 51 Allison Street, S.2 ; Miss Rhoda Hood, 357 Pollokshaws Road, S.1.

Mr. W. G. Hartley, B.Sc., delivered a lecture on Microscopy.

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## 14TH DECEMBER, 1943.

Mr. Gavin Liddell, 2 Weir Lane, Carluke, and Miss Margaret F. M'Leod, M.A., B.Sc., 54 Glasserton Road, S.3 were admitted members.

Mr. John Boyd reported the occurrence of the genus *Colias* in the Clyde Area. *Colias hyale* was seen in the Isle of Cumbrae on 1st July, 1935. *Colias croceus* was observed at Portencross on 31st July, 1941, and again on 17th September, 1941, and at Largs on 23rd September, 1941.

"The Goodfellow Lecture" was delivered by Dr. B. T. Cromwell on "Ferns and Fern Allies."

On account of the somewhat restricted time available it was decided to confine the subject to a talk on the British Ferns.

More than half of our 18 genera of native ferns are monotypic, i.e., only a single species occurs in this country. The most notable of these monotypic genera are *Blechnum*, *Cryptogramme*, *Trichomanes*, *Adiantum*, *Osmunda*, *Pteridium*, *Ophioglossum* and *Botrychium*.

This remarkable fact admits of two possible explanations, (1) that the fern flora of Britain is vestigial, the remaining members being remnants of an earlier and much richer fern flora, and (2) that there has been a northward encroachment of types well represented further south. The view that our fern flora is vestigial receives most support.

Beginning with the Palaeozoic representatives *Osmunda*, *Ophioglossum* and *Botrychium* and progressing from the



ancient to the more recent types, a general description of the habitats of the various ferns was given. Reference was also made to the hygrophilous and calcicolous types from the point of view of adaptation to environment.

Brief cultural directions were given for the majority of the types mentioned and the methods used in raising young plants from spores were discussed.

The economic uses of ferns, although very few, were mentioned, with special reference to the use of the extract of the rhizome of *Dryopteris Filix-Mas* as a vermifuge.

The fact that many genera which at one time were quite plentiful in certain areas have now become extinct, was deplored, and an appeal was made to naturalists to lead the way in attempting to stop the further reduction in numbers of the more rare types. A suggestion was put forward that young plants could be raised from spores and used to re-colonise areas which are suited to the growth of the particular ferns concerned.

## FROM THE SECTIONAL REPORTS.

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### Botanical Section.

Mr. Prasher reported that on an excursion to Fannyside Moor on 14th August *Oxycoccus palustris*, Pers., *Briza media*, Linn., and *Ophioglossum vulgatum*, Linn., were observed.

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### Geological Section.

Mr. Cannon reported that, during an excursion to Arden Quarry, a hypostoma of a Trilobite, *Phillipsia* (sp.), was discovered—a **record** for the area.

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### Microscopical Section.

Mr. Maclean reported on a series of "Talks," etc., given to this section during the session. Viz. :—

Feb. 25—"The Care and Use of the Microscope," by Mr. A. G. Woodger.

Mar. 25—"A Talk on *Sphagnum*," by Mr. John R. Lee.

Apr. 19—"Preparing and Mounting Rock Sections," by Mr. H. Osborne.

Apr. 27—"Simple Methods for the Microscopic Examination of Insects," by Professor L. A. L. King.

On 26th October and 23rd November Mr. Rattray gave instruction on section cutting, mounting and staining.



## INDEX.

- Acarina, 96  
 Acherontia atropos, 91  
 Adiantum, 127  
 Adoxa Moschatellina, Rust on, 87  
 Agar, 123  
 Agrotis exclamationis, 91  
     segetum, 92  
 Ailsa Craig, 75, 100  
 AIRD, ROBERT, 36  
 Albert Bridge, Glasgow, 33, 76  
 Aleurobuis farinae, 97  
 Algæ, Freshwater, Garry, 42  
 Allobophora, 92  
 ALSTON, GAVIN, 24, 25, 26, 30  
 Amateur Botany in the Scottish  
     National Park, Small, 79  
 ANDERSON, DAVID, 39  
 Andersonian Naturalists' Society, 42,  
     44, 49, 51, 99  
 Anuraphis padi, 92  
 Aphelenchoides fragariae, 97  
 Aplozia cordifolium, 98  
 Aquarium Fishes, Sneedon, 81  
 Arachnida, 96  
 Arbuck, Glen, 78, 94, 118, 124.  
 Arden Limestone, 93  
     Quarry, 129  
 Argyllshire, Records of Excursions to,  
     Ross, 49  
 Argyresthia conjugella, 92  
 Arrochar, 97  
 Auchenreoch Glen, Geology of, Cannon,  
     86, 93  
 Auchentorlie Glen, 94, 118, 119, 124  
 Auchincruive, 76, 91, 92, 97  
 Aulacaspis rosæ, 92  
 Autumn Diary, An, Elmhirst, 84  
  
 BAIN, JESSIE G., 80  
 BALFOUR-BROWNE, Prof., W.A.F., 87,  
     126  
 Balfon, 78  
 Balgray Dam, 73, 74  
 Ballagan Glen, 124  
 Ballantrae, 91, 96  
 Balloch Park, 37  
 Barbula, 12  
 BARCLAY, ANDREW, 49  
 Bardowie, 90  
 Barosma, 57  
 BARTHOLOMEW, JAMES, 80  
 Bartramia, 17  
 Bartsia viscosa, 89  
 BAXTER, W. R., 35  
  
 Bearsden, 78  
 Bee-keeping, Graham, 88  
 Bee sub-section, 95  
 Bennane Head, 75  
 Bibio, 92  
 Bird Life, Changes in, Bartholomew, 80  
 Birdnesting Trip to Ireland, McCrindle,  
     38  
 Birds, Carmichael and District, Gray  
     83  
     Darvel District, Hopkins, 24, 81  
     Hareshawmuir, 30  
     Islay, Ross, 49  
     Islay, Additional notes, Ross, 49  
     First Arrival of Summer Birds to  
         the Clyde Area, Robertson, 33  
         34, 36, 40, 76-78, 81, 84, 87,  
         120  
     Something about Birds, Emery,  
         36  
     Summer Birds of Tarbet, Loch  
         Fyne, Ross, 49  
 Bishopbriggs, 77, 125  
 Blackbird, 28, 125  
 Blanjulus guttulatus, 97  
 Blechnum, 127  
 BOND, Dr. G., 81  
 Botrychium, 127  
 Bowling, 106  
 BOYD, JOHN, 126, 127  
 BOYES, JOHN, 35  
 BRAID, Prof., K. W., 37, 40  
 Brains Trust, Natural History, 86, 87  
 Brambling, 25  
 British Association Handbook, Mam-  
     malia, 99  
     Fauna and Flora, 117  
 Briza media, 129  
 Brodick, 33  
 BROWN, JAMES, B., 75  
 Bryobia, 96  
 Bryum, 2, 14, 21  
 BUCHANAN, DAVID, 37  
 BULL, JOSEPH H., 126  
 Bullfinch, 25  
 Bunting, Corn, 25, 80  
     Little, 26  
     Reed, 26, 29  
     Snow, 26  
     Yellow, 25, 26  
 BURMAN, ARTHUR, 83  
 BURMAN, HARRY, 83  
 Burnbank, Galston, 30, 31  
 BURNS, ROBERT, 100



- BURNS, WILLIAM, 39, 84  
 Bute, 33, 34  
 Butterfly, Clouded Yellow, 84  
     Peacock, 91  
 Buzzard, 29  
  
 Cadzow, 76  
 CAIRNEY, Dr., Largs, 50  
 Calder, River North, 93  
 Callus on Pine Stem, Braid, 40  
 CAMERON, Dr. J. INGLIS, 88, 122  
 CAMERON, Mrs., 88  
 Campanula rapunculoides, 90  
 CAMPBELL, RODERICK S.F., 124  
 Campsie Hills, 77, 93  
 Campylopus, 12  
 CANNON, WILLIAM J., 38, 79, 83, 86,  
     93, 118, 124, 129  
 Card Catalogue, 50  
 Care and Use of the Microscope,  
     Woodger, 129  
 Carex aquatilis, 89  
     divisa, 83  
     limosa, 89  
 Carmichael, 76  
 Carmichael and District, Birds of,  
     Gray, 83  
 Cart, River Black, 93  
 Cart, River White, 93  
 Castle Semple Loch, 78  
 Caterpillars, Domestic Life of, Balfour-  
     Browne, 126  
 Catharinia, 20  
 Census of Glasgow Rookeries, A, 99  
 Ceratophyllum demersum, 38  
 Ceuthorrhynchus quadridens, 90  
 Chaffinch, 25, 29, 125  
 Chara, 116  
 Chiffchaff, 27, 33, 34, 76, 77, 78, 97, 120  
 Chortophila Brassicæ, 92  
 CHRISTIE, WILLIAM, 80  
 Chrysosplenium alternifolium, 89  
 Cinnamon Bark, 57  
 Circium arvense, var. setosum, 90  
 Clarkston, Renfrewshire, 83  
 Clober, 89  
 Coal, 93, 94, 118  
 Coal Seams of the Auchentorlie and  
     Arbuck Glens, Cannon, 118  
 Coatbridge, 34, 76, 77  
 Coleoptera, 90  
 Colias, 84, 127  
 Collection and Drying of Medicinal  
     Plants, Rattray, 86  
 CONACHER, H. R. J., 84  
 CONNELL, JOHN G., 35, 82  
 Conostomum, 17, 21  
 Convolvulus Hawk Moth, 88  
 Coot, 31  
  
 Cornerake, 31, 33, 34, 76, 77, 78, 120  
 Cornus sanguinea, 89  
 Cosmia trapizina, 38  
 Covington, 83  
 COZENS, E. K., 126  
 CRAIG, JEAN, C. D., 86, 124  
 Craigton Burn, 89  
 CRAWFORD, JOHN S., 81  
 CREE, JOHN G., 79, 82, 85, 86, 122, 125  
 Creeper, Tree, 27  
 CROMWELL, B. T., 81  
 Crossbill, Common, 25, 83  
     Two-Barred, 25  
 Crow, Carrion, 24  
     Hooded, 24  
 Cryptogramme, 127  
 Cuckoo, 26, 29, 33, 34, 76, 77, 78, 120  
 Cumbernauld, 87, 88, 90  
 Cumbræ, 127  
 Curlew, 31  
 Cyclops, 122  
  
 Dalry, 33, 34, 76, 77, 78, 89, 90  
 Dalsersf, 78, 87  
 Daphnia, 122  
 Darnley, 93  
 Darvel, 24 - 34, 76, 78, 81  
 Delphinium, 91  
 Diaspis—See Aulacaspis  
 Dicranella, 12  
 Dicranum, 10, 12  
 Dipper, 29  
 Diptera, 51  
 Dove, Stock, 30  
 DOWNES, JOHN ANTHONY, 83, 86  
 DOYLE, MATTHEW, 87  
 DREWELL, CHARLES H., 126  
 Drugs in Plants, Mode of Production  
     of, 82  
 Dryopteris Felix-Mas, 128  
 Duck, Tufted, 30  
 Dunbartonshire (detached portion)  
     87, 88  
     "Duncan Gray," 100  
 Dunlin, 31  
 DUNLOP, Dr. JAMES, 37  
 DUNLOP, EVA, 40  
 DUNNACHIE, Miss A. D. H., 126  
 Dunoon, 77  
 Dunure, 33  
  
 Eastern Dunbartonshire, Flora of,  
     Lee, 87  
 Echium vulgare, 90  
 Edinburgh Zoo, Pettigrew, 82, 122  
 Eel, Story of Common, Morrison, 84  
 ELLIS, Professor DAVID, 101  
 ELMHIRST, RICHARD, 40, 83, 84, 123  
 Elodea canadense, Flow of Sap in,

- Smith, 86-87  
 EMERY, G. A., 36  
 Encalypta, 19  
 Epilobium nummularifolium, 89, 90  
 Eriophyes ribis, 96  
 Erythraea Centaurium, 90  
 Euonymus, 91  
 EWING, Mrs. E. R., 35  
 EWING, PETER, 47
- Fairies' Lake, 98  
 Falcon, Peregrine, 30  
 Falkirk, 101  
 Fannyside Moor, 129  
 Fenwick, 77  
 FERNIE, MURRAY, 87  
 Ferns, Cromwell, 127  
 FETHNEY, J. R., 83  
 Fieldfare, 28  
 Filters in Photography, The Use of,  
 Wilson, 124  
 First Arrivals of Summer Birds,  
 Robertson, 33, 34, 36, 40, 76-78, 81,  
 84, 87, 120-1, 125, 126  
 FISHER, JAMES, 75  
 Fissidens bryoides, 4, 10, 12, 21  
 Flora, Britannica, Smith, 107  
 Glottiana, Hopkirk, 107  
 of E. Dunbartonshire, Lee, 87  
 of Lanarkshire, Patrick, 107  
 The Clydesdale, Hennedy, 107  
 FLORENCE, CHARLES, 39  
 Flow of Sap in Elodea, Smith, 86-87  
 Flycatcher, Pied, 27  
 Spotted, 27, 33, 34, 76, 77,  
 78, 121  
 Fontinalis antipyretica, 18, 21  
 FORBES, EDWARD, J., 40  
 Foraminifera, Life of the, Jepps, 85  
 FRASER, HELEN L., 82  
 Fulmar Petrel, 75, 96
- Galium Mollugo, 90  
 Galston, 28-30  
 GARDNER, J. ALLAN, 83  
 GARRICK, J. ALLAN, 80  
 Garrion Bridge, 76  
 GARRY, ROBERT (Obituary), 42  
 Geology of Auchencroch Glen, Cannon,  
 86  
 Geology of Oban District, Cannon, 83  
 GIBB, AGNES, 126  
 Gigartina stellata, 123  
 GILMOUR, Dr. THOMAS, 49  
 Glasgow Naturalist, The, 117  
 GLEN, Mrs. MARY, 35  
 Glen Douglas, 98  
 Godwit, Black-tailed, 37, 73-74  
 Goldcrest, 27  
 Goldfinch, 24  
 GOODFELLOW LECTURES—  
 Drugs in Plants, The Mode of  
 Production of, Cromwell, 82  
 Ferns, Cromwell, 127  
 Life of the Foraminifera, Jepps, 85  
 Recent Advances in Plant Micro-  
 scopy, Rattray, 53-72, 88, 95  
 Structure of Peristome, etc., Lee,  
 1-23, 41  
 Trout Fisheries, Slack, 38  
 Goose, Grey, 30  
 Snow, 30  
 GORDON, THOMAS B., 85  
 T. H. M., 126  
 Gortyna micacea, 91  
 Gourcock, 34  
 GRAHAM, JAMES C., 37-39, 88, 95  
 GRAHAM KERR, Professor J., 40  
 GRANT, ALLAN R., 122  
 GRANT, DOUGLAS, 39  
 GRAY, ROBERT, 39, 82, 83, 86, 123,  
 125, 126  
 Grebe, Great Crested, 30  
 Little, 30, 108  
 Greenfinch, 24  
 Greenshank, 31  
 Grimmia, 10, 12  
 Grouse, Black, 31  
 Red, 32  
 Gull, Black Headed, 31  
 Common, 31  
 Great Black Backed, 31  
 Herring, 31  
 Lesser Black Backed, 31, 76, 77  
 78, 120  
 GUTHRIE, GEORGE, 49  
 Gypsum, 93
- Hadena oleracea, 91  
 Hareshawmuir, Birds of, 30  
 HARTLEY, W. G., 127  
 Haw Craig, 94  
 Hawk, Sparrow, 30  
 HAYTHORN, JOHN W., 122  
 HEADLEY, Miss, 40  
 Helensburgh, 89  
 Hen Harrier, 30  
 HENDERSON, ROBERT, (Obit.) 47, 82  
 Hennedy's "Clydesdale Flora," 47, 107  
 Hepialus, 91  
 Heron, 30  
 Heronries, 99  
 Herring and its Fishing, Marshall, 40  
 Heterodera schachtii, 97  
 marioni, 97  
 HINDLE, Professor EDWARD, 79, 80,  
 123, 126  
 Hippuris vulgaris, 90, 116

- Hobby, 29  
 HODGE, ROBERT, 39  
 HODGSON, DAVID, 79, 82  
 Hogganfield Loch, 108  
 HOLDEN, ALFRED, 87  
 HOLLOWAY, LIONEL, 87  
 Holy Loch, Argyll, 85  
 HOOD, RHODA, 127  
 HOPKINS, ANDREW, 25  
     NICOL, 24-32, 74, 81, 84  
 HOPKIRK, THOMAS, of Dalbeth, 117  
 Hornwort, 38  
 HUNTER, JAMES G., 80  
     JOHN, 80  
*Hypericum humifusum*, 89  
*Hypnum cupressiforme*, 5, 14, 21  
     intermedium, 84, 89  
     vernicosum, 84, 89  
*Hypocera carinifrons*, 92  
*Hyponomeuta cognatella*, 91  
  
*Impatiens Noli-me-tangere*, 37  
 Inheritance in Plants, Lloyd, 36  
 Insects in Stored Food Products,  
     Downes, 86  
 Insects, Microscopic Examination of,  
     King, 129  
 Irvine, River, 24, 28, 31, 34  
 Islay, Birds of, Ross, 49  
  
 JACK, JAMES, 36, 39, 81, 85  
 Jackdaw, 24, 75  
 JAMIESON, WILLIAM, 96, 123  
 Jasper, 124  
 Jay, 24, 83  
 JEPPE, DR. MARGARET W., 85, 125  
 JOHNSTONE, ROBERT H., 35, 37, 80  
 JONES, JOHN H., 126  
*Juncus glaucus*, 90  
  
 Kelvin Basin, 93  
 Kenmuir Home Park, Bishopbriggs,  
     125  
 KERR, ROBERT, 86  
 Kestrel, 29  
 Kilchattan Bay, Bute, 33  
 Kilmacolm, 33, 34, 77, 78  
 Kilpatrick Hills 93, 118, 124  
 KING, JAMES J. F. X., 49  
     Professor L. A. L., 35, 36, 37,  
         38, 39, 129  
     Professor THOMAS, 47, 50  
 Kingfisher, 29  
 Kintyre, Mull of, 75  
 Kirkintilloch, 87, 88  
 KIRKWOOD, JAMES, 35, 85  
 Kite, 30  
  
*Lactuca muralis*, 89  
 Lambhill, 34, 105  
  
 Landrail (see Cornerake)  
 LANDSBOROUGH, Rev. DAVID, 24  
 Lanfine Estate, 24-32  
 Laoigh, Beinn, (Photo, D. Patton), 98  
 Lapwing, 31  
 Largs, 34, 76, 77, 78, 127  
 Lawers, 101  
 LEE, JOHN R., 1-22, 35, 37, 41, 82, 83,  
     84, 87, 88, 98, 124, 129  
 Lenzie, 73  
*Lepidium Smithii*, 89  
*Lepidoptera*, 91  
 LESLIE, J. DUNCAN, 79, 122, 123, 125  
 LEVIN, 72  
 LIDDELL, GAVIN, 127  
 Lignite, 118  
 Lindsay Burn, 27  
 Linn Park, Glasgow, 78  
 Linnean Society, 37, 50  
 Linnet, 25  
 Liquorice Powder, Compound, 54  
 Little Loch, Renfrewshire, 84, 89  
 LLOYD, Dr. BLODWYN, 35, 36, 81  
 Long, Loch, 98  
 LONGMUIR, HELEN, 83  
 LOTHIAN, JAMES P., 36  
 Loudon Estate, 24-32  
 Luggiebank, 36, 77, 78, 81  
 LUNAM, GEORGE, 37, 39  
*Lycopodium clavatum*, 64  
*Lycopus europæus*, 90  
*Lysimachia thyrsiflora*, 106  
  
 McCALLIEN, Dr. W. J., 36  
 McCALLUM, ADA, 85  
 MCCRINDLE, JOHN, 38  
 MACGREGOR, ROBERT, 123  
 McGROUTHER, THOMAS (Obit.), 84, 101-  
     102  
     JAMES C., 102  
 MACINTYRE, AIRD, 87  
 MCINTYRE, WILLIAM, 123  
 MACKECHNIE, ROBERT, 83  
 MACKENZIE, MARGARET A., 123  
 MACKEITH, T. THORNTON, 75  
 MACKIE, Mr and Mrs. D. W., 36  
 MACLEAN, GEORGE, 36, 39, 40, 79, 86,  
     124, 129  
 McLEAN, ROBERT, 82  
 McLEAN, WILLIAM, 37, 88, 93  
 MACLELLAND, MRS., 126  
 McLEOD, MARGARET F., 127  
 MACNAIR, JOHN A., 37  
 McNEIL, CHARLES, 39  
 Magpie, 24  
 Mallard, 30  
 MARSHALL, Dr. SHEINA, 40  
 Martin, House, 29, 33, 34, 76, 77, 78,  
     120  
     Sand, 29, 33, 34, 76, 77, 78, 120



- MARTIN, THOMAS, 79  
 MASON, 72  
 MAXWELL, J. HARRISON, 123  
 Medicinal Plants, Collecting and  
   Drying of, Rattray, 86  
 Megoura viciae, 92  
 MEIKLE, AGNES A., 35, 38, 79, 86  
 Melilotus alba, 90  
   arvensis, 90  
 Menyanthes trifoliata, 89  
 Merlin, 29  
 Microscopical Society of Glasgow, 125  
 Millport Marine Biological Station, 40,  
   42, 123  
 Milliken Park, 76  
 Milngavie, 33, 76, 77, 89, 92, 97  
 MILROY, WILLIAM, 79, 82  
 Mitchell Library, 50  
 Mniun, 14  
 Mole Cricket, 80  
 Monkland Canal, 90  
 Moorhen, 31  
 Morchella esculenta, 80  
   semilibera, 80  
 MORRISON, Dr. NORMAN, 84  
 MORTON, JOHN W., 37  
 Moth, Convolvulus, 88  
 Motherwell, 34, 76, 77, 78  
 MOWAT, G. T., 126  
 MURDOCH, ALEXANDER, 87  
 Murroch Glen, 93  
 Muskoka Lake, Flowering Plants of,  
   Radford, 39  
 Myosotis arvensis, var. umbrosa, 90  
 Myriapoda, 97  
  
 Natural History Society of Glasgow, 24,  
   42, 44, 46, 49, 51, 99, 117  
 Naturalists in Germany, King, 38  
 Neillia opulifolia, 89  
 Nematoda, 97  
 New Records—  
   Carex divisa, Huds, 83  
   Ceratophyllum demersum, Linn,  
     38  
   Phillipsia, 129  
   Ptilidium pulcherrimum, (Web)  
     Hampe, 41  
   Solanum Dulcamara, forma, 85  
 Newmilns, 24  
 NICOL, JAMES S., 39, 79  
   Mrs. J. S., 39  
 Nightjar, 29  
 Nitrogen Fixation by Living Organ-  
   isms, Bond, 81  
 Norway, Arctic, Garrick, 80  
 Nuphar luteum, 89  
  
 Oban District, Geology of, Cannon, 83  
  
 Obituary Notices—  
   CREE, JOHN G., 125  
   GARRY, ROBERT, 42  
   HENDERSON, ROBERT, 50, 82  
   McGROUTHER, THOMAS, 101  
   ROBERTSON, JOHN, 43  
   ROSS, ALEXANDER, 48, 82  
   WATT, H. BOYD, 99  
   WATT, LAWRENCE A., 44  
 Ophioglossum vulgatum, 90, 127, 129  
 ORD, GEORGE M., 50, 51  
 Ornithopus perpusillus, 90, 124  
 Orthotrichum, 15, 20, 21  
 Oryzæphilus surinamensis, 91  
 OSBORNE, H., 123, 129  
 Osmunda, 127  
 Ousel, Ring, 28, 78  
 Owl, Barn, 29  
   Long Eared, 29  
   Short Eared, 29  
   Tawny, 29, 124-5  
 Oxyccoccus palustris, 89, 129  
 Oyster Catcher, 30  
  
 Palisade Ratio, 61, 62  
 PARKINSON, SAMUEL, 83  
 Partridge, Common, 32  
 "Patella" by Dr. Robertson, Elmhirst,  
   40  
 PATERSON, GAVIN, 124  
   JEAN, 85  
   JOHN, 50, 51, 73, 99, 100  
   Mr. (Gamekeeper), 30  
 PATTON, Dr. DONALD, 39, 49, 79  
 Peacock Butterfly, 81  
 Pearl, 124  
 Pemphigus bursarius, 92  
 Peristome, The Structure of, Lee, 1-23,  
   41  
 Petasites albus, 90  
 Petrel, Fulmar, 75, 96  
   Storm, 30  
 PETTIGREW, WILLIAM M., 39, 82, 85,  
   122  
 Pettinain, 83  
 Pharmacognosy, 53  
 Pheasant, 32  
 Phillipsia, 129  
 Photo-Micrography, Maclean, 40  
 Phragmites, 114  
 Pieris brassicae, 91  
 Pigeon, Wood, 30  
 Pipit, Meadow, 26, 29  
   Tree, 26, 29, 33, 34, 76, 77, 78,  
   120  
 Plant Microscopy, Recent Advances  
   in, Rattray, 53-72  
 Plover (See Lapwing)  
   Grey, 31



- Plover, Golden, 30  
*Plusia moneta*, 91  
*Poa nemoralis*, 89  
*Pollenia rudis*, 92  
 Pollok Park, 34, 77  
*Polypodium vulgare*, 124  
*Polystomella*, 85  
*Polytrichum*, 20, 21  
 Portencross, 127  
 Possil Marsh, 33, 37, 74, 76, 80  
 Possil Marsh, A Retrospect, Rennie,  
 105-117, 126  
*Potamogeton obtusifolius*, 38  
*Potentilla Tormentilla*, 89  
     reptans, and hybrid, 89  
 POYNTING, LEO F., 123  
 PRASHER, RICHARD, 39, 79, 124, 129  
 Proceedings, Digest of, 35, 79, 122  
*Psila rosæ*, 92  
*Psylla mali*, 92  
*Psylliodes chrysocephala*, 90  
*Ptilidium pulcherrimum*, 41  
*Puccinia adoxæ*, 87  
*Pyrellia cyanacolor*, 92  
 Quekett Microscopical Club, 37  
 RADFORTH, NORMAN W., 39  
 Rail, Water, 31  
*Ranunculus bulbosus*, 90  
     *Lingua*, 106  
 RATTRAY, GORDON, 53-72, 86, 88, 95,  
 124, 129  
 Raven, 24  
 Recent Advances in Plant Microscopy,  
     Ratray, 53-72  
 Records (See New Records)  
 Redbreast, 29  
 Redpoll, Lesser, 25  
     Mealy, 25  
 Redshank, Common, 31  
 Redstart, 29, 33, 76, 77, 78, 120  
 Redwing, 28  
 REID, ALEX. M., 40  
 RENNIE, WILLIAM, 37, 38, 73, 79, 80,  
 87, 105-117, 124, 126  
*Rhamnus Frangula*, 89  
 Richmond Park, Glasgow, 76, 77, 78,  
 84  
 Riddrie, 90  
 ROBERTSON, Dr. of Millport, 40  
     IAN, 75, 80  
     JOHN (Obit.), 43  
     JOHN, (Ornithologist), 49,  
     73, 74  
     THOMAS, 33, 35, 36, 40, 75-  
     78, 81, 84, 87, 97, 120,  
     125, 126  
 Robin, (See Redbreast)  
 Rock Sections, Preparing and Mount-  
     ing, Osborne, 129  
 Roman Wall, 101  
 Rook, 24, 125  
 Rookeries, 99, 125  
 ROSS, ALEXANDER, 37, 48, 50, 51, 82,  
 100  
 Rouken Glen, 76  
*Rubus Moylei*, var. *scotica*, 89  
 Ruchill, 124  
 RUFF, HELEN M. G., 40  
 RUSSELL, FRED, 36  
     WILLIAM, 35, 37-39, 79, 84,  
     85  
 SABIR, 72  
*Salix Petiolaris*, 107  
*Sambucus nigra*, var. *laciniata*, 89  
 Sandpiper, Common, 31, 33, 34, 76, 77,  
 78, 120  
     Green, 31  
 SAWERS, JOHN, 39  
 Scotland's Gems, McCallien, 36  
 Scotstoun, 33  
 SCOTT, MABEL G., 82  
     T. D., 35  
 Scottish National Park, Small, 79  
     Wild Bird Sanctuary Trust, 116, 117  
     Naturalist, 73  
 Seals, Whales, Dolphins, etc., 99  
*Sedum Telephium*, 89  
     *viscosum*, 89  
*Senecio Jacobæa*, 25  
*Senna* (Cassia), 54  
 Seyler's Chart, 118, 119  
 SHANKS, ARCHIBALD, 50, 51, 82, 100,  
 124  
 Shearwater, Manx, 30  
 Shrike, Great Grey, 27  
 SIME, D., 124  
 Simple Photo-Micrography as an Aid  
     to Nature Study, Maclean, 40  
 Siskin, 24  
*Sisymbrium altissimum*, 90  
 SKASE, R. P., 124  
 Skelmorlie, 89  
 Skylark, 26  
 SLACK, Dr., H. D., 38  
 SMALL, LILIAS, 79, 85  
 SMILLIE, EDITH, 85  
 SMITH, JOHN, Dalry, 100  
     J. T., 86, 123  
     Lieut., F. W., 88  
     WILLIAM, 35  
 SNEEDEN, Dr. J. B. O., 81  
 Snipe, Common, 31  
     Great, 31  
     Jack, 31  
*Solanum Dulcamara*, 85  
 Sparrow, Hedge, 29, 125  
     House, 25, 125  
*Sphagnum*, A Talk on, Lee, 129  
*Spiræa salicifolia*, 89  
*Splachnum*, 16, 17, 21  
 STANLEY DICKSON D., 124

- Starch Grains, 66  
 Starling, 24, 125  
 STEWART, E. J. A., 35, 50, 82  
     JOHN, 123  
 Stirlingshire, Records of Excursions to,  
     Ross, 49  
 STOLLERY, ERNEST W. R., 123, 124  
     Mrs. MARY T., 127  
 Stonechat, 19  
 Story of the Common Eel, Morrison, 84  
 Strathblane, 33  
 Structure of the Peristome in various  
     Mosses, Lee, 1-23, 41  
 Summer Birds, First Arrivals, Robert-  
     son, 33, 34, 36, 40, 76-78, 81, 84,  
     87, 125, 126  
 Summerston, 33, 74, 76, 78  
 Swallow, 29, 33, 34, 76, 77, 78, 100, 120  
 Swan, Mute, 30  
 Swift, 29, 33, 34, 76, 77, 78, 120  
 SWORD, WILLIAM C., 35  
 SYME, VICTOR M., 126  
 Symington, 33  
 TAILBY, SIDNEY, 86, 88  
 Tarbet, Loch Fyne, Summer Birds,  
     Ross, 49  
 Teal, 30  
 Tenebrio obscurus, 91  
 Tern, Common, 31, 33, 34, 76, 77, 78,  
     121  
     Sandwich, 96  
 Tetraxis pellucida, 20, 21  
 Theobaldia annulata, 92  
 THOMSON, J. L., 37  
 Thrush, Mistle, 28  
     Song, 28, 96  
 Tipulidae of Glasgow District, Ord and  
     Henderson, 51  
     List for B.A. Handbook, 1901,  
     51  
 Tit, Blue, 27  
     Coal, 27  
     Great, 27  
     Long Tailed, 27  
     Willow, 27  
 Tollcross Sandpits, 90  
 Toothwort, 80  
 Torrance, 33, 77  
 Tortula, 12, 13, 21  
 Tragopogon pratensis, 90  
 Trichomanes, 127  
 Trichostomum, 12  
 Trientalis europæus, 90  
 Trilobite, 129  
 Trisetum flavescens, 90  
 Trollius europæus, 124  
 Trout Fisheries, Slack, 38  
 Twite, 25  
 Typha, 115  
 Utricularia vulgaris, 107  
 Vein Islet Number, 58  
 Valerianella olitoria, 124  
 VERNON, Rev. E. F., 81  
 Wagtail, Blue Headed, 26  
     Grey, 26  
     Pied, 26  
     White, 26, 33, 34, 76, 77, 78,  
     120  
     Yellow, 26, 33, 34, 76, 77, 78,  
     120  
 WALLIS, Dr., T. E., 64, 72  
 WALTON, Professor JOHN, 79  
 Warbler, Blackcap, 28, 77, 78  
     Garden, 28, 33, 34, 76, 77, 78,  
     121  
     Grasshopper, 28, 33  
     Sedge, 28, 33, 34, 76, 77, 78,  
     96, 120  
     Willow, 27, 29  
     Wood, 27  
 Wasp, Ground, 36  
     Norwegian, 36  
 Water Bloom and some Geological  
     Implications—Conacher, 84  
 WATT, HUGH BOYD (Obit), 84, 99-100  
     LAWRENCE A. (Obit), 44  
 Waulkmill Glen, 74  
 Waxing, 27, 85  
 Webera, 14, 21  
     polymorpha, 98  
     nutans, 98  
 WELSH, ADAM, 37  
 Wemyss Bay, 78  
 Whangie, 41  
 Wheatear, 28, 33, 34, 76, 77, 78, 120  
     Greenland, 28  
 Whimbrel, 31  
 Whinchat, 28, 33, 34, 76, 77, 78, 120  
 WHITE, ROBERT M., 123, 124  
 WHITEHEAD, Professor A. N., 54  
 White Loch, Stewarton Road, 77  
 Whitethroat, 28, 33, 34, 76, 77, 78, 120  
     Lesser, 28  
 WHYTE, ROBERT F., 126  
 Widgeon, 30  
 WILSON, HARRY, 126  
     H. C., 124  
 Windshield Moor, 30  
 Winter Diary, A, Almhirst, 123  
 WOOD, JAMES, R., 35  
 Woodcock, 31  
 WOODGER, A. G., 37, 129  
 WOODLAND, PHYLLIS, 38, 82, 86, 95  
 Woodpecker, Great Spotted, 29, 83  
 Wren, 29  
     Willow, 33, 34, 76, 77, 78, 120  
     Wood, 33, 34, 76, 77, 78, 121  
 XORNIG and WEISS, 72

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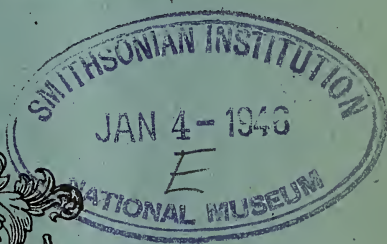
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## SUMMARY OF CONTENTS.

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| PAPERS—   | PAGE |
|---|------|
| The Flora of Easter Dumbartonshire - - -<br>John R. Lee.  | 1    |
| List of First Arrivals of Summer Birds in the Clyde<br>Area in 1944 - - - - -<br>Thomas Robertson | 19   |
| Note on the Capercaillie - - - - -<br>S. McClelland.  | 21   |
| DIGEST OF THE PROCEEDINGS OF THE SOCIETY - - - - -  | 22   |
| NOTES FROM EXCURSION REPORTS - - - - -  | 28   |
| NOTES FROM SECTIONAL REPORTS - - - - -  | 31   |

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## THE FLORA OF EASTER DUMBARTONSHIRE

(Parishes of Kirkintilloch and Cumbernauld).

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Paper read to the Society by  
Mr. JOHN R. LEE on 13th October, 1942.

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Recently the members of the Botanical Section of our Society have been engaged in making a list of the plants occurring in the small detached portion of the political county of Dumbarton, which consists of the two old parishes of Kirkintilloch and Cumbernauld. The desirability of such a list, and the reasons which have induced us to undertake its compilation, must first of all be explained in some detail.

As most botanical students are aware, the system almost universally adopted in this country for recording the observed occurrence of plant species is that proposed by H. C. Watson in his great work entitled *Cybele Britannica*, the four volumes of which, published privately about the middle of last century, constitute an early but wonderfully comprehensive and scientifically accurate treatment of the complex problems of geographical distribution. The first volume appeared in 1847, the second in 1849, the third in 1852, and the concluding volume in 1859. A *Supplement* appeared in the following year, and a *Compendium* (in three volumes) some 8-10 years later. In the years 1873 and 1874 he published a further work entitled *Topographical Botany* (two volumes),



in which a practical application of the principles laid down in the *Cybele* is elaborated. The system thus inaugurated has received general acceptance, and is now adopted by all practical workers in recording, not only the flora, but the fauna also, of the British Islands.

Prior to Watson's time there had, of course, appeared numerous valuable records of observations by local workers in different parts of the country. These, as was natural, often took the form of county lists; and in wisely adopting the county as a basic unit of area Watson was able to make use of much material lying ready to hand. In the system now in use the whole of Great Britain is divided into "vice-counties" which are, in the majority of cases, identical with the political divisions. In the case of the smaller counties the boundaries follow, in most instances, natural and easily-traced lines, such as rivers, watersheds, etc., which from the point of view of the naturalist are quite satisfactory. Many of the larger counties, however, are far too large, and some embrace areas differing too greatly to be treated as units, and so have to be subdivided into smaller portions. In this way there are derived from the 84 political counties of Great Britain (40 English, 12 Welsh, and 32 Scottish), a total of 112 vice-counties, which are numbered consecutively from south to north. Following similar lines, the 32 counties of Ireland have subsequently been divided into 40 such vice-counties.

Confining our attention to Great Britain, the 112 vice-counties are grouped into "provinces" so arranged as to separate the groups into natural drainage areas as far as possible. So far as our own vicinity is concerned, the provinces mainly fall into two categories — those draining towards the North Sea and those towards the Atlantic on the west.

It is not at all surprising that, as time went on and work was undertaken by an increasing number of students in different areas, many minor difficulties should have arisen, and that in some instances these divisions should have been found unsatisfactory. In fact, the surprising thing is, not

that such difficulties arose, but that Watson's plan should have been found so eminently workable, and that, despite inevitable criticism, no other workable plan has ever been proposed.

One of the difficulties to which we have referred has confronted those of our workers who undertook some years ago the construction of the "Clyde Card Catalogue," which aims at giving—on Watsonian lines—an index to the distribution of plants and animals in the Clyde drainage area. Of the Watsonian vice-counties which are wholly or partially included in our area there are two at least which overlap from the neighbouring "East Highlands" province into the drainage of the Clyde, and consequently should, to that extent, belong by rights to what is called the "West Highlands" province. These are the vice-counties of Stirling (No. 86) and West Perth (No. 87). This has long been observed, and it has been usual in making any records from these vice-counties to distinguish material collected in the Loch Lomond area from that recorded from the eastern drainage. For the purposes of the Catalogue it was found advisable to refer the Perthshire records to a special category, under the vice-comital number 87a.

An attempt to distinguish Stirlingshire material in a similar manner, however, raised further difficulties. The western drainage of Stirlingshire is not all towards Loch Lomond. A considerable portion of the county, and that embracing an area of great interest from a Natural History standpoint, drains by the Kelvin direct to the Clyde. Much material recorded for the county had in consequence been simply marked as from "vice-county 86," and thus included in the "East Highlands" province, whilst in reality the record belonged to the Clyde area. But there was a further and still more serious complication. An important part of the upper Kelvin drainage is politically included in the county of Dumbarton, although separated from the main part of that county. This had evidently been overlooked in the original definitions of the relative vice-counties, with the result that some doubt existed concerning some of the records

of species from that part of our area. The question which arose, and had not been previously determined, was: Should this detached part be regarded for our purposes as included in Dumbarton (vice-county 99) or as forming part of Stirling (vice-county 86)? There was the added difficulty that many old records from the area were known to have been marked "99," others marked "86" were suspected to be from the detached part of Dumbarton; whilst in both cases no distinction had been drawn from material collected in the main part of the counties concerned.

The committee in charge of the Catalogue decided very wisely to distinguish three parts of the doubtful Stirling county falling within the Clyde area, and to regard the detached part of Dumbarton as belonging to Stirling. The portions of vice-county 86 draining to the Clyde are therefore, in the Catalogue, numbered 86a (Dumbarton in Stirling), 86b (Stirling proper—Kelvin drainage), and 86c (Stirling—Loch Lomond drainage). There is, however, a further complication still. The watershed dividing the drainage areas of the Clyde and Forth passes through the detached part of Dumbarton which, it was agreed, should belong to Stirling; so that a considerable part of it does not come within the ambit of the Catalogue. This eastern portion should therefore be excluded from the Clyde list, and regarded as forming part of Stirling proper (v.c. 86).

But it was now found that there was great difficulty in knowing, in the case of many species, whether existing records could be safely assumed to apply to the doubtful area. Especially was this the case with some of the commoner ones. That a fairly frequently occurring plant had been recorded from both v.c. 86 and v.c. 99 might of course mean that it was found well distributed over both counties, but on the other hand it might be common in the main part of both but absent from v.c. 86a. Equally it might occur in this detached portion and be absent from the rest of the county. Again, in the case of a rare or infrequent species the distinction might become a matter of even greater importance. The



only way of resolving the difficulty was evidently to make a survey of the doubtful area; and with this view it was decided that a useful piece of work lying ready to our hand should be undertaken by the Botanical Section, and a series of excursions was accordingly arranged to localities included within the two parishes of Cumbernauld and Kirkintilloch. Members were asked to note every plant species actually found growing wild within the geographical boundaries of the area, and to communicate to the Convener all their observations, however unimportant these might appear to be. In this way a considerable list of plants has been compiled, and we are greatly indebted to those who have responded by taking the trouble to place their observations at our disposal.

Our survey has extended to all plant species noted within the area; but although a considerable number of the lower forms have been noted, we are at present able to deal only with the Flowering Plants and Pteridophytes. It may perhaps be possible to add a list of the Bryophyta, Fungi and Algae at some later date. Nor can we claim completeness for the present list even of the higher forms. There are many obvious gaps—plant species which it is difficult to imagine as being absent, but which have simply not come within our observation during any of our visits. It has, however, been deemed advisable to place the list before the Society, imperfect as it may be, in the hope that it may form a basis for further observations, and in any case to place on record what has actually been done.

A few topographical notes upon the area in question may first of all be given. It forms an irregular oval, stretching east and west in its greatest diameter for about 11 miles, and varying in breadth north and south from about two to nearly five miles. Its northern boundary is constituted by the River Kelvin, except for a small part at Kirkintilloch, where it diverges northwards so as to include a portion of that town lying on the north side of the river. This boundary divides the area from the parish of Kilsyth in Stirlingshire. The short western boundary runs in a very irregular line southwards to a point a little to the west of Lenzie Moss, from which the southern boundary extends in an almost straight



line to the Luggie Water a short distance above the farm of Barbeth, near Mollinsburn. Up to this point the march is with the parish of Cadder in Lanarkshire, which here meets the boundary of New Monkland parish, also Lanarkshire. The county boundary then follows the course of the Luggie upwards to a point about a mile beyond the village of Luggiebank, and then strikes eastwards to the county march between Lanarkshire and Stirlingshire. From here it runs for a short distance north-eastwards, the march being with the Stirlingshire parish of Slamannan, skirting the edge of Fannyside and Garbethill moors, the most easterly point of the latter being also the most easterly extremity of the area. From this point the boundary follows that of the Stirlingshire parish of Falkirk, running irregularly north-westwards to Castlecary, beyond which it again meets the boundary of Kilsyth parish. The area we are dealing with is thus enclosed on the north and east and for a distance on the south-east also, by Stirlingshire, and really forms geographically a part of that county; which is our justification for regarding it as a section of vice-county 86.

The ground embraced within the area may be said in general to slope upwards steadily from west to east, its highest point being reached at an altitude of nearly 600 feet above sea-level on Fannyside moor. This is in the centre of an extensive plateau comprising the moors of Fannyside and Garbethill, large parts of which are covered with a fairly deep deposit of peat on which are great stretches of typical heather-moor. Here also are the two lochs of Fannyside, where wild-fowl abound, and the usual plants of such localities form the features of the vegetation. On its western side this high ground drops fairly steeply to a rather shallow depression in which lies the glen of Cumbernauld, a portion of which is occupied by the policies of Cumbernauld House. Here, and a little to the eastwards, there are some patches of woodland, in which many interesting plants noted on our visits have been seen. The greater part of this eastern plateau, together with the glen, is in the portion which, as already explained, must be excluded from the Clyde area, the drainage being towards the east, mainly by the Bonny Burn

which runs eastwards to the Carron, a tributary of the Forth. Parallel with the northern boundary of the area, and steeply sloping towards the upper part of the Kelvin valley, there runs a ridge of high ground, the northern slope of which is for the most part wooded. Here again we meet with ground of great interest from the botanist's standpoint. Part of this ridge towards its eastern end is also in the Forth drainage, including the part on which is situated the village of Cumbernauld. The ridge is broken in its middle between Croy and Auchenstarry, at which point the area is intersected by the parish boundary dividing the two parishes of which it is composed. The highest part of the ridge is a little to the east of Croy, where it attains a height of nearly 500 feet above sea-level. Further west it assumes more definite shape as the Bar Hill, near the foot of which, on its northern slope, is the village of Twechar. East of the parish boundary, between Auchenstarry and Cumbernauld, there is a stretch of very interesting ground, with beautiful woodlands, in which is situated the village of Dullatur. This part, sloping towards the head-waters of the Kelvin, has proved one of the richest corners for our purposes. The remainder of the area, which includes the major portion of the parish of Kirkintilloch, is largely under cultivation; and, though disfigured in part by the unfortunate results which seem to be inevitable accompaniments of the coal-mining industry, yet presents on the whole a pleasing aspect to the eye. There are also some patches of woodland here and there, and one or two corners where wild nature still dominates the scene. One of the most important of these, of course, is at the extreme western end of the area, where at Lenzie Moss we have what was a happy hunting ground of the Society for many years. The county boundary crosses the moss so that its most southern part is in Lanarkshire; but there is sufficient of it within our limits to allow of our including in our list one of the most interesting plant species of the Clyde area—*Andromeda polifolia*—one of the very few stations for which in our district is at Lenzie.

As already stated, the list as it stands omits a considerable number of plants which can only be regarded as absent on

account of the imperfect nature of our observations; for instance, among others, such very common species as the black medick, moschatel, and sweet woodruff. One of the most remarkable gaps is the common butter-bur (*Petasites vulgaris*), although the list includes the much less frequent white-flowered species (*P. albus*) which has been found in a number of localities.

At this point we should like to express our special indebtedness to Mr. James Jack, whose intimate acquaintance with the area has enabled him to add substantially to our results. Mr. Jack has not only contributed many valuable items to our list of plants, but has on many occasions acted as our guide over various parts, thus enabling us to obtain much information which would otherwise have been missed.

The compilation of the list has revealed one or two rather interesting results in connection with the known distribution of many plant species. For instance, there are some of our records which do not appear in either Dumbartonshire or Stirlingshire in the records given in Druce's *Comital Flora* published in 1932, nor among any of the records subsequently published. These are *Hypericum dubium* Leers., *Fragaria elatior* Ehrh., *Epilobium tetragonum* L., *Pulmonaria officinalis* L., *Calystegia sepium* Br., *Orchis maculata* L., *Orchis prætermissa* Dr., and *Pinus sylvestris* L. There is also the case of *Reseda lutea* L., which is given in the *Comital Flora* for Stirlingshire enclosed in square brackets, indicating that the record requires confirmation.

Some of the records obtained on our excursions are additions to those given in the *Flora of the Clyde Area* under Section D (which includes the Kirkintilloch-Cumbernauld area). These are *Nasturtium sylvestre* Br., *Reseda lutea* L., *Silene inflata* Sm., *Claytonia sibirica* L., *Hypericum dubium* Leers., *Ribes nigrum* L., *Epilobium nummularifolium* R. Cunn., *Aster longifolius* Lam., *Jasione montana* L., *Lysimachia thyrsiflora* L., *Convolvulus arvensis* L., *Carex aquatilis* Wahl., *Milium effusum* L., *Glyceria aquatica* Sm., and *Festuca pratensis* Huds.

The question as to whether alien plants occurring as



casuals or garden outcasts should be included has been considered. These are not numerous, and it has been decided to include them, with a note in each case as to the locality and the source of the record.

In all cases the occurrence of the species in "Clyde" or "Forth" is distinguished, and introductions (known or suspected) are noted as such. The arrangement and nomenclature is that followed in the *Flora of the Clyde Area*.

|  |     |     |     |     |     | Clyde | Forth |
|--|-----|-----|-----|-----|-----|-------|-------|
| Anemone nemorosa L.  | ... | ... | ... | ... | ... | x     | x     |
| Ranunculus Flammula L.   | ... | ... | ... | ... | ... | x     | x     |
| Ranunculus Ficaria L.  | ... | ... | ... | ... | ... | x     | x     |
| Ranunculus acris L.  | ... | ... | ... | ... | ... | x     | x     |
| Ranunculus repens L.   | ... | ... | ... | ... | ... | x     | x     |
| Ranunculus Lenormandi F.Sch.   | ... | ... | ... | ... | ... | —     | x     |
| Caltha palustris L.  | ... | ... | ... | ... | ... | x     | x     |
| Trollius europæus L.   | ... | ... | ... | ... | ... | —     | x     |
| Berberis vulgaris L.   | ... | ... | ... | ... | ... | x     | x     |
| Nuphar luteum Sm.  | ... | ... | ... | ... | ... | x     | —     |
| Meconopsis cambrica Vig.   | ... | ... | ... | ... | ... | x     | —     |
| <i>A garden outcast.</i>   |     |     |     |     |     |       |       |
| Chelidonium majus L.   | ... | ... | ... | ... | ... | x     | —     |
| Corydalis claviculata DC.  | ... | ... | ... | ... | ... | x     | x     |
| Nasturtium officinale Br.  | ... | ... | ... | ... | ... | x     | x     |
| Nasturtium sylvestre Br.   | ... | ... | ... | ... | ... | x     | —     |
| Barbarea vulgaris Br.  | ... | ... | ... | ... | ... | x     | —     |
| Cardamine amara L.   | ... | ... | ... | ... | ... | x     | x     |
| Cardamine pratensis L.   | ... | ... | ... | ... | ... | x     | x     |
| Cardamine hirsuta L.   | ... | ... | ... | ... | ... | x     | x     |
| Cardamine hirsuta L., var. sylvatica Link.                                   | ... | ... | ... | ... | ... | x     | x     |
| Sisymbrium officinale Scop.  | ... | ... | ... | ... | ... | x     | —     |
| Sisymbrium altissimum L.   | ... | ... | ... | ... | ... | x     | —     |
| <i>A casual. Near Twechar (specimen in University Herbarium).</i>            |     |     |     |     |     |       |       |
| Sisymbrium Alliaria Scop.  | ... | ... | ... | ... | ... | x     | x     |
| Erysimum orientale R. Br.  | ... | ... | ... | ... | ... | x     | —     |
| <i>Canal bank near Twechar. A casual (specimen in University Herbarium).</i> |     |     |     |     |     |       |       |
| Brassica Sinapis Vis.  | ... | ... | ... | ... | ... | x     | x     |
| Camelia sativa Crantz, var. foetida L.                                       | ... | ... | ... | ... | ... | x     | —     |
| <i>Canal, near Twechar (specimen in University Herbarium).</i>               |     |     |     |     |     |       |       |
| Capsella Bursa-pastoris Mönch  | ... | ... | ... | ... | ... | x     | x     |



|                                      |     |     |     |     |     |     | Clyde | Forth |
|--------------------------------------|-----|-----|-----|-----|-----|-----|-------|-------|
| Raphanus Raphanistrum L.             | ... | ... | ... | ... | ... | ... | —     | x     |
| Reseda lutea L.                      | ... | ... | ... | ... | ... | ... | x     | —     |
| Viola palustris L.                   | ... | ... | ... | ... | ... | ... | x     | x     |
| Viola sylvatica Fr.                  | ... | ... | ... | ... | ... | ... | x     | x     |
| Viola tricolor L.                    | ... | ... | ... | ... | ... | ... | x     | —     |
| Viola lutea Huds.                    | ... | ... | ... | ... | ... | ... | —     | x     |
| Silene Inflata Sm.                   | ... | ... | ... | ... | ... | ... | x     | —     |
| Lychnis diurna Sibth.                | ... | ... | ... | ... | ... | ... | x     | x     |
| Lychnis vespertina Sibth.            | ... | ... | ... | ... | ... | ... | x     | —     |
| Lychnis Flos-cuculi L.               | ... | ... | ... | ... | ... | ... | x     | x     |
| Cerastium glomeratum Thuill.         | ... | ... | ... | ... | ... | ... | x     | x     |
| Cerastium triviale Link.             | ... | ... | ... | ... | ... | ... | x     | x     |
| Stellaria nemorum L.                 | ... | ... | ... | ... | ... | ... | x     | —     |
| Stellaria media Vill.                | ... | ... | ... | ... | ... | ... | x     | x     |
| Stellaria Holostea L.                | ... | ... | ... | ... | ... | ... | x     | x     |
| Stellaria uliginosa Murr.            | ... | ... | ... | ... | ... | ... | x     | x     |
| Stellaria graminea L.                | ... | ... | ... | ... | ... | ... | x     | x     |
| Arenaria trinervia L.                | ... | ... | ... | ... | ... | ... | x     | x     |
| Arenaria serpyllifolia L.            | ... | ... | ... | ... | ... | ... | x     | —     |
| Sagina procumbens L.                 | ... | ... | ... | ... | ... | ... | x     | x     |
| Sagina subulata Presl.               | ... | ... | ... | ... | ... | ... | x     | —     |
| Spergula arvensis L.                 | ... | ... | ... | ... | ... | ... | x     | x     |
| Montia fontana L.                    | ... | ... | ... | ... | ... | ... | x     | x     |
| Claytonia sibirica L.                | ... | ... | ... | ... | ... | ... | x     | x     |
| Chenopodium album L., var. viride L. | ... | ... | ... | ... | ... | ... | x     | —     |
| Atriplex patula L.                   | ... | ... | ... | ... | ... | ... | x     | —     |
| Polygonum cuspidatum Sieb. & Zucc.   | ... | ... | ... | ... | ... | ... | x     | x     |
| Polygonum Bistorta L.                | ... | ... | ... | ... | ... | ... | x     | x     |
| Polygonum aviculare L.               | ... | ... | ... | ... | ... | ... | x     | x     |
| Polygonum Convolvulus L.             | ... | ... | ... | ... | ... | ... | —     | x     |
| Polygonum amphibium L.               | ... | ... | ... | ... | ... | ... | x     | —     |
| Polygonum Persicaria L.              | ... | ... | ... | ... | ... | ... | x     | x     |
| Polygonum Hydropiper L.              | ... | ... | ... | ... | ... | ... | x     | —     |
| Rumex longifolius DC.                | ... | ... | ... | ... | ... | ... | x     | x     |
| Rumex crispus L.                     | ... | ... | ... | ... | ... | ... | x     | x     |
| Rumex obtusifolius L.                | ... | ... | ... | ... | ... | ... | x     | x     |
| Rumex Conglomeratus Murr.            | ... | ... | ... | ... | ... | ... | x     | —     |
| Rumex Acetosa L.                     | ... | ... | ... | ... | ... | ... | x     | x     |
| Rumex Acetosella L.                  | ... | ... | ... | ... | ... | ... | x     | x     |
| Hypericum perforatum L.              | ... | ... | ... | ... | ... | ... | x     | —     |
| Hypericum dubium Leers.              | ... | ... | ... | ... | ... | ... | x     | —     |
| Hypericum tetrapterum Fr.            | ... | ... | ... | ... | ... | ... | x     | —     |
| Hypericum pulchrum L.                | ... | ... | ... | ... | ... | ... | x     | x     |
| Tilia europæa L.                     | ... | ... | ... | ... | ... | ... | x     | x     |
| Linum catharticum L.                 | ... | ... | ... | ... | ... | ... | x     | x     |

|  |     |     |     |     |     |   |   |
|--|-----|-----|-----|-----|-----|---|---|
| Geranium dissectum L.                                      | ... | ... | ... | ... | ... | x | — |
| Geranium Robertianum L.                                    | ... | ... | ... | ... | ... | x | x |
| Oxalis Acetosella L.                                       | ... | ... | ... | ... | ... | x | x |
| Polygala vulgaris L.                                       | ... | ... | ... | ... | ... | x | x |
| Acer Pseudoplatanus L.                                     | ... | ... | ... | ... | ... | x | x |
| Æsculus Hippocastanum L.                                   | ... | ... | ... | ... | ... | x | x |
| Ilex Aquifolium L.   | ... | ... | ... | ... | ... | x | x |
| Empetrum nigrum L.   | ... | ... | ... | ... | ... | — | x |
| Euphorbia Helioscopia L.                                   | ... | ... | ... | ... | ... | x | — |
| Mercurialis perennis L.                                    | ... | ... | ... | ... | ... | x | x |
| Callitriche verna L.                                       | ... | ... | ... | ... | ... | x | — |
| Ulmus montana Sm.  | ... | ... | ... | ... | ... | x | x |
| Urtica dioica L.   | ... | ... | ... | ... | ... | x | x |
| Urtica urens L.  | ... | ... | ... | ... | ... | x | — |
| Humulus Lupulus L.   | ... | ... | ... | ... | ... | x | x |
| Populus tremula L.   | ... | ... | ... | ... | ... | x | x |
| Populus nigra L.   | ... | ... | ... | ... | ... | — | x |
| Salix pentandra L.   | ... | ... | ... | ... | ... | x | x |
| Salix fragilis L.  | ... | ... | ... | ... | ... | x | x |
| Salix alba L.  | ... | ... | ... | ... | ... | x | x |
| Salix purpurea L.  | ... | ... | ... | ... | ... | x | — |
| Salix Caprea L.  | ... | ... | ... | ... | ... | x | x |
| Salix cinerea L.   | ... | ... | ... | ... | ... | x | x |
| Salix aurita L.  | ... | ... | ... | ... | ... | — | x |
| Salix viminalis L.   | ... | ... | ... | ... | ... | x | x |
| Betula alba L.   | ... | ... | ... | ... | ... | x | x |
| Betula pubescens Ehrh.                                     | ... | ... | ... | ... | ... | x | x |
| Alnus glutinosa Gærtn.                                     | ... | ... | ... | ... | ... | x | x |
| Carpinus Betulus L.  | ... | ... | ... | ... | ... | x | — |
| Corylus Avellana L.  | ... | ... | ... | ... | ... | x | x |
| Quercus Robur L.   | ... | ... | ... | ... | ... | x | x |
| Fagus sylvatica L.   | ... | ... | ... | ... | ... | x | x |
| Castanea sativa Mill.                                      | ... | ... | ... | ... | ... | x | x |
| Ulex europæus L.   | ... | ... | ... | ... | ... | x | x |
| Sarothamnus scoparius Wimm.                                | ... | ... | ... | ... | ... | x | x |
| Trifolium pratense L.                                      | ... | ... | ... | ... | ... | x | x |
| Trifolium medium L.  | ... | ... | ... | ... | ... | x | x |
| Trifolium repens L.  | ... | ... | ... | ... | ... | x | x |
| Trifolium hybridum L.                                      | ... | ... | ... | ... | ... | x | — |
| Trifolium minus Sm.  | ... | ... | ... | ... | ... | x | x |
| Lotus corniculatus L.                                      | ... | ... | ... | ... | ... | x | x |
| Lotus major Scop.  | ... | ... | ... | ... | ... | x | x |
| Ornithopus perpusillus L.                                  | ... | ... | ... | ... | ... | x | — |
| <i>Canal, near Kirkintilloch (specimen in Univ. Herb.)</i> |     |     |     |     |     |   |   |
| Vicia sepium L.  | ... | ... | ... | ... | ... | x | x |



## Clyde Forth

|                                    |     |     |     |     |     |   |   |
|------------------------------------|-----|-----|-----|-----|-----|---|---|
| Ribes Grossularia L.               | ... | ... | ... | ... | ... | x | — |
| Drosera rotundifolia L.            | ... | ... | ... | ... | ... | x | x |
| Drosera anglica Huds.              | ... | ... | ... | ... | ... | — | x |
| Lythrum Salicaria L.               | ... | ... | ... | ... | ... | x | — |
| Hippuris vulgaris L.               | ... | ... | ... | ... | ... | x | — |
| Myriophyllum spicatum L.           | ... | ... | ... | ... | ... | x | — |
| Epilobium nummularifolium R. Cunn. | ... | ... | ... | ... | ... | x | — |
| Epilobium angustifolium L.         | ... | ... | ... | ... | ... | x | x |
| Epilobium hirsutum L.              | ... | ... | ... | ... | ... | x | — |
| Epilobium parviflorum Schreb.      | ... | ... | ... | ... | ... | x | x |
| Epilobium montanum L.              | ... | ... | ... | ... | ... | x | x |
| Epilobium tetragonum L.            | ... | ... | ... | ... | ... | x | — |
| Epilobium palustre L.              | ... | ... | ... | ... | ... | x | — |
| Circæa lutetiana L.                | ... | ... | ... | ... | ... | x | x |
| Astrantia major L.                 | ... | ... | ... | ... | ... | x | — |

*Near Luggiebank (probably a garden outcast).*

|                                 |     |     |     |     |     |   |   |
|---------------------------------|-----|-----|-----|-----|-----|---|---|
| Sanicula europæa L.             | ... | ... | ... | ... | ... | x | — |
| Ægopodium Podagraria L.         | ... | ... | ... | ... | ... | x | x |
| Conopodium denudatum Koch.      | ... | ... | ... | ... | ... | x | x |
| Myrrhis odorata Scop.           | ... | ... | ... | ... | ... | x | x |
| Anthriscus sylvestris L.        | ... | ... | ... | ... | ... | x | x |
| Peucedanum Ostruthium Koch.     | ... | ... | ... | ... | ... | x | x |
| Heracleum Sphondylium L.        | ... | ... | ... | ... | ... | x | x |
| Torilis Anthriscus Gærtn.       | ... | ... | ... | ... | ... | x | x |
| Hedera Helix L.                 | ... | ... | ... | ... | ... | x | — |
| Viburnum Opulus L.              | ... | ... | ... | ... | ... | x | — |
| Sambucus nigra L.               | ... | ... | ... | ... | ... | x | x |
| Sambucus racemosa L.            | ... | ... | ... | ... | ... | x | x |
| Lonicera Periclymenum L.        | ... | ... | ... | ... | ... | x | x |
| Symphoricarpos racemosus Michx. | ... | ... | ... | ... | ... | x | x |

*An introduction, but abundant and spreading.*

|  |     |     |     |     |     |   |   |
|--|-----|-----|-----|-----|-----|---|---|
| Galium verum L.                          | ... | ... | ... | ... | ... | x | x |
| Galium palustre L., var. Witheringii Sm. | ... | ... | ... | ... | ... | x | x |
| Galium saxatile L.                       | ... | ... | ... | ... | ... | x | x |
| Galium Aparine L.                        | ... | ... | ... | ... | ... | x | x |
| Valeriana officinalis L.                 | ... | ... | ... | ... | ... | x | x |
| Scabiosa succisa L.                      | ... | ... | ... | ... | ... | x | x |
| Solidago Virgaurea L.                    | ... | ... | ... | ... | ... | x | x |
| Bellis perennis L.                       | ... | ... | ... | ... | ... | x | x |
| Aster longifolius Lam.                   | ... | ... | ... | ... | ... | x | — |

*Canal bank near Auchenstarry, a garden outcast but abundant and spreading.*

|                          |     |     |     |     |     |   |   |
|--------------------------|-----|-----|-----|-----|-----|---|---|
| Gnaphalium sylvaticum L. | ... | ... | ... | ... | ... | x | — |
| Gnaphalium uliginosum L. | ... | ... | ... | ... | ... | x | x |
| Achillea Ptarmica L.     | ... | ... | ... | ... | ... | x | x |



|                                       |     |     |     |     |     | Clyde | Forth |
|---------------------------------------|-----|-----|-----|-----|-----|-------|-------|
| Achillea Millefolium L.               | ... | ... | ... | ... | ... | x     | x     |
| Chrysanthemum Leucanthemum L.         | ... | ... | ... | ... | ... | x     | x     |
| Chrysanthemum segetum L.              | ... | ... | ... | ... | ... | x     | —     |
| Chrysanthemum Parthenium Pers.        | ... | ... | ... | ... | ... | x     | —     |
| Matricaria inodora L.                 | ... | ... | ... | ... | ... | x     | x     |
| Matricaria suaveolens Buch.           | ... | ... | ... | ... | ... | x     | x     |
| Tanacetum vulgare L.                  | ... | ... | ... | ... | ... | x     | —     |
| Artemisia vulgaris L.                 | ... | ... | ... | ... | ... | x     | —     |
| Tussilago Farfara L.                  | ... | ... | ... | ... | ... | x     | x     |
| Petasites albus Gærtn.                | ... | ... | ... | ... | ... | x     | —     |
| Senecio vulgaris L.                   | ... | ... | ... | ... | ... | x     | x     |
| Senecio viscosus L.                   | ... | ... | ... | ... | ... | x     | —     |
| Senecio Jacobæa L.                    | ... | ... | ... | ... | ... | x     | x     |
| Senecio aquaticus Huds.               | ... | ... | ... | ... | ... | x     | x     |
| Arctium minus Schk.                   | ... | ... | ... | ... | ... | x     | x     |
| Cirsium lanceolatum Scop.             | ... | ... | ... | ... | ... | x     | x     |
| Cirsium palustre Scop.                | ... | ... | ... | ... | ... | x     | x     |
| Cirsium arvense Scop.                 | ... | ... | ... | ... | ... | x     | x     |
| Cirsium heterophyllum Hill            | ... | ... | ... | ... | ... | —     | x     |
| Centaurea nigra L.                    | ... | ... | ... | ... | ... | x     | x     |
| Lapsana communis L.                   | ... | ... | ... | ... | ... | x     | x     |
| Crepis virens L.                      | ... | ... | ... | ... | ... | x     | —     |
| Crepis paludosa Mœnch.                | ... | ... | ... | ... | ... | x     | x     |
| Hieracium Pilosella L.                | ... | ... | ... | ... | ... | x     | x     |
| Hieracium aurantiacum L.              | ... | ... | ... | ... | ... | x     | —     |
| <i>Croy Station, a garden escape.</i> |     |     |     |     |     |       |       |
| Hieracium vulgatum Fr.                | ... | ... | ... | ... | ... | x     | —     |
| Hieracium auratum Fr.                 | ... | ... | ... | ... | ... | x     | x     |
| Hieracium boreale Fr.                 | ... | ... | ... | ... | ... | x     | —     |
| Hypochæris radicata L.                | ... | ... | ... | ... | ... | x     | x     |
| Leontodon autumnalis L.               | ... | ... | ... | ... | ... | x     | x     |
| Taraxacum officinale Web.             | ... | ... | ... | ... | ... | x     | x     |
| Sonchus arvensis L.                   | ... | ... | ... | ... | ... | —     | x     |
| Sonchus asper Hoffm.                  | ... | ... | ... | ... | ... | x     | x     |
| Campanula rotundifolia L.             | ... | ... | ... | ... | ... | x     | x     |
| Jasione montana L.                    | ... | ... | ... | ... | ... | x     | —     |
| Vaccinium Myrtillus L.                | ... | ... | ... | ... | ... | x     | x     |
| Oxycoccus palustris Pers.             | ... | ... | ... | ... | ... | x     | x     |
| Andromeda polifolia L.                | ... | ... | ... | ... | ... | x     | —     |
| Erica Tetralix L.                     | ... | ... | ... | ... | ... | x     | x     |
| Erica cinerea L.                      | ... | ... | ... | ... | ... | —     | x     |
| Calluna vulgaris Salisb.              | ... | ... | ... | ... | ... | x     | x     |
| Rhododendron ponticum L.              | ... | ... | ... | ... | ... | x     | x     |
| <i>Commonly planted.</i>              |     |     |     |     |     |       |       |
| Primula vulgaris Huds.                | ... | ... | ... | ... | ... | —     | x     |

## Clyde Forth

|  |     |     |     |     |   |   |
|--|-----|-----|-----|-----|---|---|
| Lysimachia thyrsoflora L.  | ... | ... | ... | ... | x | — |
| Lysimachia nemorum L.  | ... | ... | ... | ... | x | x |
| Trientalis europæa L.  | ... | ... | ... | ... | — | x |
| Plantago major L.  | ... | ... | ... | ... | x | x |
| Plantago lanceolata L.   | ... | ... | ... | ... | x | x |
| Ligustrum vulgare L.   | ... | ... | ... | ... | x | — |
| Fraxinus excelsior L.  | ... | ... | ... | ... | x | x |
| Menyanthes trifoliata L.   | ... | ... | ... | ... | x | — |
| Echinosperrum Lappula L.   | ... | ... | ... | ... | x | — |
| <i>Canal bank near Twechar, a casual (specimen in Univ. Herb.)</i> |     |     |     |     |   |   |
| Symphytum officinale L.  | ... | ... | ... | ... | x | x |
| Symphytum tuberosum L.   | ... | ... | ... | ... | x | x |
| Pulmonaria officinalis L.  | ... | ... | ... | ... | — | x |
| <i>Garden outcast.</i>   |     |     |     |     |   |   |
| Myosotis palustris With.   | ... | ... | ... | ... | x | — |
| Myosotis palustris With., var.                                     |     |     |     |     |   |   |
| strigulosa Reichb.   | ... | ... | ... | ... | x | — |
| Myosotis repens Don.   | ... | ... | ... | ... | x | — |
| Myosotis cæspitosa Schultz   | ... | ... | ... | ... | x | x |
| Myosotis arvensis Hoffm.   | ... | ... | ... | ... | x | x |
| Myosotis versicolor Reichb.  | ... | ... | ... | ... | x | — |
| Calystegia sepium Br.  | ... | ... | ... | ... | x | x |
| Convolvulus arvensis L.  | ... | ... | ... | ... | x | — |
| Solanum Dulcamara L.   | ... | ... | ... | ... | x | — |
| Linaria vulgaris Mill.   | ... | ... | ... | ... | x | — |
| Linaria Cymbalaria Mill.   | ... | ... | ... | ... | x | — |
| Scrophularia nodosa L.   | ... | ... | ... | ... | x | x |
| Mimulus luteus L.  | ... | ... | ... | ... | x | — |
| Digitalis purpurea L.  | ... | ... | ... | ... | x | x |
| Veronica agrestis L.   | ... | ... | ... | ... | x | — |
| Veronica arvensis L.   | ... | ... | ... | ... | x | — |
| Veronica serpyllifolia L.  | ... | ... | ... | ... | x | x |
| Veronica officinalis L.  | ... | ... | ... | ... | x | x |
| Veronica Chamædryas L.   | ... | ... | ... | ... | x | x |
| Veronica montana L.  | ... | ... | ... | ... | — | x |
| Veronica Beccabunga L.   | ... | ... | ... | ... | x | x |
| Bartsia Odontites Huds.  | ... | ... | ... | ... | x | x |
| Euphrasia officinalis L.   | ... | ... | ... | ... | x | x |
| Rhinanthus Crista-galli L.   | ... | ... | ... | ... | x | x |
| Pedicularis palustris L.   | ... | ... | ... | ... | — | x |
| Pedicularis sylvatica L.   | ... | ... | ... | ... | — | x |
| Melampyrum pratense L.   | ... | ... | ... | ... | — | x |
| Mentha alopecuroides Hull  | ... | ... | ... | ... | x | — |
| Mentha aquatica L.   | ... | ... | ... | ... | x | — |

|                                  |     |     |     |     |     |     | Clyde | Forth |
|----------------------------------|-----|-----|-----|-----|-----|-----|-------|-------|
| <i>Mentha sativa</i> L.          | ... | ... | ... | ... | ... | ... | x     | —     |
| <i>Mentha arvensis</i> L.        | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Lycopus europæus</i> L.       | ... | ... | ... | ... | ... | ... | x     | —     |
| <i>Thymus Serpyllum</i> L.       | ... | ... | ... | ... | ... | ... | x     | —     |
| <i>Nepeta Glechoma</i> Benth.    | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Prunella vulgaris</i> L.      | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Stachys sylvatica</i> L.      | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Stachys palustris</i> L.      | ... | ... | ... | ... | ... | ... | x     | —     |
| <i>Stachys ambigua</i> Sm.       | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Galeopsis Tetrahit</i> L.     | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Galeopsis speciosa</i> Miller | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Lamium purpureum</i> L.       | ... | ... | ... | ... | ... | ... | x     | —     |
| <i>Lamium album</i> L.           | ... | ... | ... | ... | ... | ... | x     | —     |
| <i>Teucrium Scorodonia</i> L.    | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Ajuga reptans</i> L.          | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Listera ovata</i> Br.         | ... | ... | ... | ... | ... | ... | —     | x     |
| <i>Orchis maculata</i> L.        | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Orchis prætermissa</i> Dr.    | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Gymnadenia conopsea</i> Br.   | ... | ... | ... | ... | ... | ... | —     | x     |
| <i>Habenaria chlorantha</i> Bab. | ... | ... | ... | ... | ... | ... | —     | x     |
| <i>Iris Pseudacorus</i> L.       | ... | ... | ... | ... | ... | ... | x     | —     |
| <i>Scilla nutans</i> Sm.         | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Juncus squarrosus</i> L.      | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Juncus conglomeratus</i> L.   | ... | ... | ... | ... | ... | ... | x     | —     |
| <i>Juncus effusus</i> L.         | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Juncus tenuis</i> Willd.      | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Juncus acutiflorus</i> Ehrh.  | ... | ... | ... | ... | ... | ... | x     | —     |
| <i>Juncus lamprocarpus</i> Ehrh. | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Juncus supinus</i> Mœnch.     | ... | ... | ... | ... | ... | ... | x     | —     |
| <i>Juncus bufonius</i> L.        | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Luzula sylvatica</i> Gaud.    | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Luzula pilosa</i> Willd.      | ... | ... | ... | ... | ... | ... | —     | x     |
| <i>Luzula campestris</i> Willd.  | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Arum maculatum</i> L.         | ... | ... | ... | ... | ... | ... | —     | x     |

*Reported from Cumbernauld Glen in Annals of the  
Andersonian Naturalists' Society, vol. 2, p. 130.*

|                                 |     |     |     |     |     |     |   |   |
|---------------------------------|-----|-----|-----|-----|-----|-----|---|---|
| <i>Lemna trisulca</i> L.        | ... | ... | ... | ... | ... | ... | x | — |
| <i>Lemna minor</i> L.           | ... | ... | ... | ... | ... | ... | x | — |
| <i>Sparganium ramosum</i> Huds. | ... | ... | ... | ... | ... | ... | x | x |
| <i>Sparganium simplex</i> Huds. | ... | ... | ... | ... | ... | ... | x | x |
| <i>Typha latifolia</i> L.       | ... | ... | ... | ... | ... | ... | x | — |
| <i>Alisma Plantago</i> L.       | ... | ... | ... | ... | ... | ... | x | — |
| <i>Triglochin palustre</i> L.   | ... | ... | ... | ... | ... | ... | x | — |
| <i>Potamogeton natans</i> L.    | ... | ... | ... | ... | ... | ... | x | — |
| <i>Eleocharis palustris</i> Br. | ... | ... | ... | ... | ... | ... | x | — |

|  |     |     |     |     |     |     | Clyde | Forth |
|--|-----|-----|-----|-----|-----|-----|-------|-------|
| <i>Scirpus setaceus</i> L.                       | ... | ... | ... | ... | ... | ... | x     | —     |
| <i>Scirpus cæspitosus</i> L.                     | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Eriophorum vaginatum</i> L.                   | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Eriophorum angustifolium</i> Roth.            | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Carex remota</i> L.                           | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Carex leporina</i> L.                         | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Carex canescens</i> L.                        | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Carex aquatilis</i> Wahl.                     | ... | ... | ... | ... | ... | ... | x     | —     |
| <i>Carex vulgaris</i> Fr.                        | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Carex glauca</i> Scop.                        | ... | ... | ... | ... | ... | ... | —     | x     |
| <i>Carex panicea</i> L.                          | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Carex caryophyllea</i> Latour                 | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Carex Oederi</i> Ehrh.                        | ... | ... | ... | ... | ... | ... | x     | —     |
| <i>Carex binervis</i> Sm.                        | ... | ... | ... | ... | ... | ... | x     | —     |
| <i>Carex sylvatica</i> Huds.                     | ... | ... | ... | ... | ... | ... | x     | —     |
| <i>Carex ampullacea</i> Good.                    | ... | ... | ... | ... | ... | ... | —     | x     |
| <i>Phalaris arundinacea</i> L.                   | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Anthoxanthum odoratum</i> L.                  | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Alopecurus pratensis</i> L.                   | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Alopecurus geniculatus</i> L.                 | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Milium effusum</i> L.                         | ... | ... | ... | ... | ... | ... | x     | —     |
| <i>Phleum pratense</i> L.                        | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Agrostis vulgaris</i> With.                   | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Agrostis alba</i> L.                          | ... | ... | ... | ... | ... | ... | x     | —     |
| <i>Agrostis canina</i> L.                        | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Aira præcox</i> L.                            | ... | ... | ... | ... | ... | ... | x     | —     |
| <i>Deschampsia cæspitosa</i> Beauv.              | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Deschampsia flexuosa</i> Trin.                | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Holcus lanatus</i> L.                         | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Holcus mollis</i> L.                          | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Arrhenatherum avenaceum</i> , Beauv.          | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Triodia decumbens</i> Beauv.                  | ... | ... | ... | ... | ... | ... | x     | —     |
| <i>Phragmites communis</i> Trin.                 | ... | ... | ... | ... | ... | ... | x     | —     |
| <i>Cynosurus cristatus</i> L.                    | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Molinia cærulea</i> Mœnch.                    | ... | ... | ... | ... | ... | ... | —     | x     |
| <i>Dactylis glomerata</i> L.                     | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Briza media</i> L.                            | ... | ... | ... | ... | ... | ... | —     | x     |
| <i>Poa pratensis</i> L.                          | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Poa trivialis</i> L.                          | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Poa nemoralis</i> L.                          | ... | ... | ... | ... | ... | ... | x     | —     |
| <i>Poa annua</i> L.                              | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Glyceria aquatica</i> Sm.                     | ... | ... | ... | ... | ... | ... | x     | —     |
| <i>Glyceria fluitans</i> Br.                     | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Festuca ovina</i> L.                          | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Festuca ovina</i> L., var. <i>major</i> Bosw. | ... | ... | ... | ... | ... | ... | x     | —     |



|  |     |     |     |     |     |     | Clyde | Forth |
|--|-----|-----|-----|-----|-----|-----|-------|-------|
| <i>Festuca elatior</i> L.  | ... | ... | ... | ... | ... | ... | x     | —     |
| <i>Festuca pratensis</i> Huds.                                   | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Festuca gigantea</i> Vill.                                    | ... | ... | ... | ... | ... | ... | x     | —     |
| <i>Bromus asper</i> Murr.  | ... | ... | ... | ... | ... | ... | x     | —     |
| <i>Bromus mollis</i> L.  | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Lolium perenne</i> L.   | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Agropyrum repens</i> Beauv.                                   | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Nardus stricta</i> L.   | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Pinus sylvestris</i> L.                                       | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Larix europæa</i> DC  | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Picea excelsa</i> Link.                                       | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Taxus baccata</i> L.  | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Equisetum arvense</i> L.                                      | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Equisetum sylvaticum</i> L.                                   | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Equisetum limosum</i> L.                                      | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Equisetum palustre</i> L.                                     | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Ophioglossum vulgatum</i> L.                                  | ... | ... | ... | ... | ... | ... | —     | x     |
| <i>Botrychium Lunaria</i> Sw.                                    | ... | ... | ... | ... | ... | ... | —     | x     |
| <i>Pteridium aquilinum</i> Kuhn.                                 | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Blechnum boreale</i> Sw.                                      | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Asplenium Adiantum-nigrum</i> L.                              | ... | ... | ... | ... | ... | ... | x     | —     |
| <i>Asplenium Ruta-muraria</i> L.                                 | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Athyrium Filix-fœmina</i> Roth.                               | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Athyrium Filix-fœmina</i> Roth., var. <i>incisum</i> Hoffm.   | ... | ... | ... | ... | ... | ... | x     | —     |
| <i>Dryopteris Oreopteris</i> Max.                                | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Dryopteris Filix-mas</i> Schott.                              | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Dryopteris Filix-mas</i> Schott, var. <i>Borreri</i> Newm.    | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Dryopteris dilatata</i> A. Gray                               | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Dryopteris dilatata</i> A. Gray, var. <i>glandulosa</i> Newm. | ... | ... | ... | ... | ... | ... | x     | —     |
| <i>Dryopteris dilatata</i> A. Gray, var. <i>collina</i> Moore    | ... | ... | ... | ... | ... | ... | x     | —     |
| <i>Phegopteris polypodioides</i> Fee                             | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Phegopteris Dryopteris</i> Fee                                | ... | ... | ... | ... | ... | ... | —     | x     |
| <i>Polypodium vulgare</i> L.                                     | ... | ... | ... | ... | ... | ... | x     | x     |
| <i>Cystopteris fragilis</i> Bernh.                               | ... | ... | ... | ... | ... | ... | —     | x     |

# LIST OF FIRST ARRIVALS OF SUMMER BIRDS IN CLYDE AREA IN 1944, COMPILED FROM REPORTS OF MEMBERS AND FRIENDS.

By THOMAS ROBERTSON.

|       |          |                  |                                    |
|-------|----------|------------------|------------------------------------|
| Mar.  | 8—Lesser | Black - Backed   |                                    |
|       |          | Gull             | Jamaica Bdge, Glasgow (Mar. 11)    |
| "     | 13—      | "                | Largs                              |
| "     | 25—      | Wheatear         | Southend, Kintyre (Mar. 28)        |
| "     | 28—      | "                | Carmichael, Lanarkshire            |
| April | 1—       | "                | Fairlie                            |
| "     | 4—       | Chiffchaff       | Southend, Kintyre (April 8)        |
| "     | 9—       | "                | Bothwell Castle                    |
| "     | 10—      | "                | Dalry                              |
| "     | 4—       | Swallow          | Southend, Kintyre (April 10)       |
| "     | 9—       | "                | Dalry                              |
| "     | 9—       | "                | Clarkston, Glasgow                 |
| "     | 6—       | House Martin     | Castlecary, Dumbartonshire         |
|       |          |                  | (April 21)                         |
| "     | 10—      | "                | Largs                              |
| "     | 21—      | "                | Dalry                              |
| "     | 6—       | Willow Wren      | Southend, Kintyre (April 12)       |
| "     | 7—       | "                | Castlecary, Dumbartonshire         |
| "     | 8—       | "                | Bothwell                           |
| "     | 8—       | Sand Martin      | Southend, Kintyre (April 9)        |
| "     | 10—      | "                | Largs                              |
| "     | 13—      | "                | Dalry                              |
| "     | 12—      | White Wagtail    | Largs (March 27)                   |
| "     | 18—      | "                | Motherwell                         |
| "     | 13—      | Redstart         | Richmond Park, Glasgow (Apr. 27)   |
| "     | 14—      | Common Sandpiper | Southend, Kintyre (April 14)       |
| "     | 15—      | "                | Largs                              |
| "     | 15—      | "                | Darvel                             |
| "     | 22—      | Cuckoo           | Largs (April 23)                   |
| "     | 22—      | "                | Kilmacolm                          |
| "     | 23—      | "                | Carmichael, Lanarkshire            |
| "     | 22—      | Tree Pipit       | Drumpellier, Coatbridge (April 23) |
| "     | 30—      | "                | Skelmorlie                         |
| May   | 1—       | "                | Loch Fad, Bute                     |
| April | 23—      | Sedge Warbler    | Darvel (May 1)                     |
| May   | 6—       | "                | Loch Fad, Bute                     |
| "     | 8—       | "                | Dalry                              |

|                         |                              |
|-------------------------|------------------------------|
| April 25—Corncrake      | Dalry (April 24)             |
| „ 27— „                 | Southend, Kintyre            |
| May 2— „                | Kilmacolm                    |
| April 25—Whinchat       | Southend, Kintyre (April 28) |
| May 7— „                | Largs                        |
| „ 12— „                 | Richmond Park, Glasgow       |
| April 29—Yellow Wagtail | Lochwinnoch (April 21)       |
| May 1—Wood Wren         | Loch Fad, Bute (May 1)       |
| „ 2— „                  | Largs                        |
| „ 3— „                  | Rothsay                      |
| „ 3—Common Whitethroat  | Largs (May 3)                |
| „ 3— „                  | Motherwell                   |
| „ 6— „                  | Darvel                       |
| „ 6— „                  | Loch Fad, Bute               |
| „ 5—Common Tern         | Largs (May 8)                |
| „ 13— „                 | Bute                         |
| „ 14— „                 | Southend, Kintyre            |
| „ 5—Grasshopper Warbler | Southend, Kintyre (May 7)    |
| „ 13— „                 | Lochwinnoch                  |
| „ 7—Swift               | Summerston (May 2)           |
| „ 8— „                  | Dalry                        |
| „ 10— „                 | Largs                        |
| „ 13—Garden Warbler     | Darvel (May 10)              |
| „ 13— „                 | Lochwinnoch                  |
| „ 21— „                 | Bothwell Castle              |
| „ 15—Spotted Flycatcher | Southend, Kintyre (May 12)   |
| „ 20— „                 | Fairlie                      |
| „ 28— „                 | Torrance                     |

The dates in parenthesis indicate the average date over 35 years.

In comparison with the average dates shown above, 14 species were earlier this year, 3 arrived on the exact day, and 6 were later.

Of the 22 species recorded both this year and last year, 11 were earlier, 1 was on the same day, and 10 were later than in 1943.

## NOTE ON THE CAPERCAILLE

*(Tetrao urogallus urogallus).*

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*By Mr. S. McClelland.*

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Five of these large game birds, three hens and two cocks, were observed in the Airdrie area on 31st December, 1944, during a spell of very hard frost. Rare visitors to the Clyde drainage area, they probably came south from the Perthshire woods, especially from the coniferous woods which they prefer. The Capercaille was recorded in the Cumbernauld area many years ago. Originally a native of Scotland it became extinct round about 1760. It was, however, re-introduced from Scandinavia in 1837 to the woods of Taymouth Castle, whence it spread over Tayside, Deeside and Moray. It has been recorded from Dornoch in the north, Argyll in the west and from Stirling and Dunbartonshire in the south.

May we hope that this record will not prove an isolated one and that it indicates a continuing spread of a very interesting bird.





# DIGEST OF THE PROCEEDINGS OF THE SOCIETY.

Session XIV.—1944.

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|                 |   |
|-----------------|---|
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| Zoological,     | Professor L. A. L. KING, M.A., F.R.S.E. |
| Entomological,  | T. H. M. GORDON.                        |
| Microscopical,  | GEORGE MACLEAN, F.R.M.S.                |
| Geological,     | WILLIAM J. CANNON.                      |
| Photographical, | ROBERT GRAY.                            |
| Publications,   | THE EDITOR.                             |

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## SOCIETY MEETINGS.

11TH JANUARY, 1944.

The first meeting of the Fourteenth Séssion was held, Mr. J. Duncan Leslie, President, in the chair.

The Photographical Section (Convener, Mr. Robert Gray) gave its annual exhibition. This included (a) Lantern slides in colour by Mr Robert McLean, illustrating the Alpine Flora of Beinn Lawers; (b) Photomicrographs of moths' eggs by Mr. J. Duncan Leslie; and (c) a film by Mr. William M. Pettigrew depicting the beauties of West Highland scenery through the seasons, from Ardlui to Glencoe.

8TH FEBRUARY, 1944.

The Annual Business Meeting of the Society took place.

The following new members were elected:—Mr. John Arneel, 408 Allison Street, S.2; Miss Debora E. H. Cannon, 17 Bassett Crescent, W.3; Mr. James Smith, 150 Garrioch Road, N.W.

The reports of the Society's activities were read and approved. The following new office-bearers were elected:—Vice-President, Mr. James C. Graham; Members of Council, Mr. John R. Lee, Dr. Cameron, and Mr. William McLean.

---

14TH MARCH, 1944.

Professor John Walton delivered a lecture entitled, "Collecting Fossil Plants." In it he described successively casts, concretions and petrifications. The fossil collector's equipment was described and advice given on the methods to be employed in collecting, recording and labelling fossils and in arranging collections. The lecture was illustrated by lantern slides and rock specimens.

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17TH APRIL, 1944.

Mr. Charles H. Drewell lectured on "Sex." Taking examples from the various phyla of the animal kingdom up to its highest forms, the lecturer showed the vast field of knowledge which could be exploited in dealing with this subject.

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8TH MAY, 1944.

The following new members were admitted:—Mr. David A. Mackechnie, 58 Maxwell Avenue, Westerton; Mr. Andrew D. Patton, 51 Kirkland Park Avenue, Strathaven; and Master Ross Anderson, 88 Wilton Street, N.W.

The evening was devoted to a discussion on "The Educational Possibilities of Natural History." Members of the Society and representatives from other local scientific

and educational bodies took part, the aim being to consider the formation of a West of Scotland Council to foster the study of the natural and kindred sciences.

Professor L. A. L. King, remarking on the benefits resulting from an interest in Natural History, emphasised its potency as a stimulator, its value in the cultivation of observation and its legitimate position as part of a liberal education.

Dr. Absolom, of Kelvingrove Museum, suggested the formation of a liaison committee that should link up the schools with scientific societies, and that the Museum should be the centre for Natural History Societies' activities.

Mr. S. Thompson, Museums Education Officer, drew attention to the School Museum Service whereby specimens and films were available for schools.

Dr. Berry, Mr. William Rennie, Colonel Henderson, Mr. Drewell, Miss Jean Craig and Miss Petrie also joined in the discussion.

Dr. Cameron outlined a scheme for a West of Scotland Natural History and Science Council which should be representative of all bodies which were interested in the teaching or study of these subjects.

---

12TH JUNE, 1944.

The following new members were admitted:—Dr. Berry and Mr. Ian Cornwall, Ministry of Information, 95 Bothwell Street, C.2; Mr. John Frew, 44 Auchingramont Road, Hamilton; Mr. Archibald Leitch, 8 Mainhill Place, Baillieston; and Mr. David B. Clegg, 15 Douglas Gardens, Uddingston.

Mr. Thomas Robertson submitted a list of the first arrivals of British Birds in the Clyde area in 1944, compiled by members and friends. (v. Page 19).

The remainder of the evening was devoted to exhibits of the work of the sections of the Society. For the Botanical



Section, Miss Mary Glen, B.Sc., exhibited a collection of foliage and fruit of various coniferous trees. The Microscopical Section contributed slides and drawings illustrating plant and animal studies. The Zoological exhibit was devoted to entomological specimens.

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#### 10TH OCTOBER, 1944.

Mr. James A. Watt, 3 Glen Road, Springboig, E.2; Mr. Charles D. McFarlane, and Mrs. Elizabeth A. McFarlane, 7 King Edward Road, W.3; Miss Winifred Petrie, 8 Drumlin Drive, Milngavie; Mr. Alan M. Maclaurin, Guilverbeg, Kilmacolm; Dr. William S. Wilson, 180 Glasgow Road, Paisley; Mr. Thomas B. Henderson, 38 Glencairn Drive, S.1; Miss Alice Bissett, 35 Beechwood Drive, E.1; Mr. Thomas S. Colvin, 895 Cumbernauld Road, E.1; Mr. Donald R. McVean, 27 Huntly Avenue, Giffnock; and Mr. J. Martin Mackay, 179 West George Street, C.2 were elected members of the Society.

The President intimated with regret the departure from Glasgow of Professor L. A. L. King and the subsequent loss to the Society of a member of long standing who had contributed so much to the Zoological activities of the Society.

The meeting was then addressed by Mr. Charles Drewell, who spoke on "Some Biological and Genetical Aspects of Reproduction and Sex."

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#### 14TH NOVEMBER, 1944.

Owing to the unavoidable absence, through illness, of Mr. John R. Lee, who was to have given "Notes on Some Less Familiar Plants," the meeting was given over to a series of personal reminiscences. Mr. Prasher, Mr. Boyd, Mr. Johnstone and Mr. Robertson spoke of their interests in Natural History and of the way in which these had been fostered by the "Fathers" of the Society.

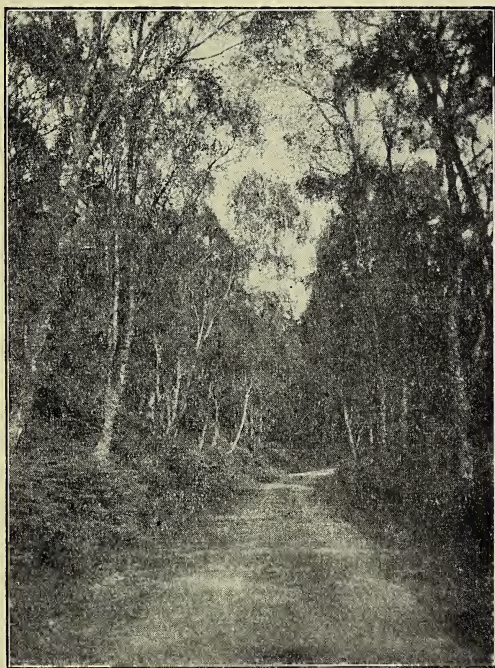
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#### 12TH DECEMBER, 1944.

The following new members were elected:—Mr. John Bennett, 92 Menock Road, S.4; Miss Isobel Thomson, 21

Keir Street, S.1; and Mr. J. C. Hogg, c/o Ministry of Labour, 65 Renfield Street, Glasgow, C.2.

Dr. A. P. Orr, biochemist at the Marine Biological Station, Millport, lectured on "The Commercial Possibilities of Seaweeds." In his introduction he gave a brief survey, illustrated by lantern slides, of the more important seaweeds. Then followed a graphic description of the methods used in the observations on and the collecting of seaweeds. Dr. Orr briefly outlined the past history of the uses of the plants, and proceeded to discuss the commercial possibilities of to-day. The commodities considered were:—Food stuffs for man and beast, potash, iodine, gum, agar, artificial silk, cellophane, plastics, etc.



THE BIRCHES, PLUSCARDEN. (Phot. D.P.)

## SOCIETY EXCURSIONS.

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DHU LOCH, BUTE, 22nd May, 1944—Conductor,  
*Mr. T. Robertson.*

A party of two ladies and eight gentlemen set out from Rothesay about 11 o'clock. The day was fine and a slight haze of cloud prevented intense heat. The route lay through the Meadows to the country lane leading by the Kirkton Dam to Loch Fad proper. Lunch was taken at the loch and then the uphill journey by the road leading to the waterworks was followed by easier going along the artificial catchment conduit to the Dhu Loch. Coming back along the opposite side of the same valley, the party made short work of the slight climb to the top of Barone Hill. The view from here is one of the finest in Scotland, but the slight haziness detracted a little from the full perfection of a really clear day. Passing downhill through the right-of-way, the members arrived back at Rothesay in time to have tea before leaving on the boat at 4.45 p.m.

The following notes on the plant life are from notes by Mr John R. Lee: The special abundance of the Yellow Pimpernel (*Lysimachia nemorum*, L.) in particularly fine flower was noteworthy. There was also a very nice clump of *Claytonia sibirica*, L. At the Dhu Loch the Shore-weed grew in abundance on the damp ground along the margin, whilst in the water was a considerable quantity of *Apium inundatum*, Reichb. In the lade near the Meadows the Lesser Water-Plantain (*Sium erectum*, Huds.) was observed. Over a large part of the route the very fine display of whin blossom made a grand sight. The rarity of the day was the discovery of the Scale Fern (*Ceterach officinarum*, Desv.), which was noticed on a low wall near Rothesay. This plant has been known in three localities in Bute for about 30 years (*Trans. Bute, N.H. Soc.* 1935). Another out-of-the-way plant observed was the Hop (*Humulus Lupulinus*, L.) trailing over a hedge near the town. Of mosses the only outstanding one observed was *Sphagnum papillosum*, Lindb.

There was an abundance of bird life to be seen. The only



nest discovered was that of the Common Sandpiper in a broken bank above a small water conduit at the Dhu Loch. One of the parent birds was sitting and allowed a close approach to be made before it flew off, to reveal the nest with four eggs.

A sight to delight the eyes of an ornithologist was provided by the graceful movements of some 40 Terns (Probably both the Common and the Arctic species were here.) which were around a small island on the Kirkton Dam. These were newly back from their long winter migration to the seas around South Africa or even to the Antarctic. Other summer migrants were also in good numbers, headed by the Willow Wren, Swallow and Swift. The Cuckoo, Whitethroat and Sedge Warbler were heard or seen.

The total of species was 37, of which none could be called uncommon in Bute.

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LOCH LIBO, 1st July, 1944—Conductor,  
Professor L. A. L. King.

This excursion was characterised by the wetness of the day, the small number of participants (four), the overcrowded train, the wetness of the ground and the enjoyment derived from the excursion by those who were present.

Despite the unsatisfactory conditions the following observations were made by Mr. John R. Lee.

Perhaps the most striking thing noted was the change obviously taking place in the character of the undergrowth in the woodland due to the increasing spread of the Rose-Bay Willowherb (*Epilobium angustifolium*, L.). This plant so rampant now over all the country, can be seen here in direct conflict with the Red Campion (*Lychnis diurna*, Sibth.) which has long been a striking feature of the woods beside Loch Libo. The Campion is still abundant but is evidently having a struggle to hold the ground in competition with the increasing *Epilobium*.

Another feature of these woods is the great abundance of the three large ferns — *Athyrium*, *Filix-fœmina*, Roth., *Dryopteris Filix-mas*, Schott, and *D. dilatata*, A. Gray, which



together with the Bracken make up a considerable part of the woodland flora. Of the first-named fern—the Lady Fern—an abundance of the *var. incisum*, Hoffm. was observed.

At the head of the loch two species of small trees arrested attention in passing — the Bay-Leaved Willow (*Salix pentandra*, L.) and the Aspen (*Populus tremula*, L.).

Of the lake and marsh vegetation around the margin of the loch by far the most interesting plant was, of course, the rare Water Hemlock (*Cicuta virosa*, L.) of which a considerable number of specimens was seen, one large plant just about to break into flower. There are large beds of Reed-Mace (*Typha latifolia*, L.) in a swamp near the lower end of the loch, and here the usual marsh vegetation is luxuriantly developed. The Bog-Bean (*Menyanthes trifoliata*, L.) was past flowering but the Marsh Cinquefoil (*Comarum palustre*, L.) and the Yellow Flag (*Iris Pseudacorus*, L.) were still in bloom. The Cat's Valerian (*Valeriana officinalis*, L.) and the Water Ragwort (*Senecio aquaticus*, Huds.) were beginning to appear in flower, but there was still no signs of the blooms of the Meadow Sweet (*Spiræa Ulmaria*, L.), all of which were abundant, however.

Other plants noted in the marsh were *Myosotis cæspitosus*, Schultz, *Mimulus luteus*, L. and *Orchis maculata*, L.

One of the botanical attractions of Loch Libo is the considerable variety of sedge plants, and some attention to the Cyperaceae was given by Mr. Boyd and myself. The common Spike Rush (*Eleocharis palustris*, Br.) is particularly abundant along the water edge. Of the sedges proper (*Carex*) the following were noted, but there are probably many others which we did not see:—

|                                   |                          |
|-----------------------------------|--------------------------|
| <i>Carex teretiuscula</i> , Good. | <i>C. canescens</i> , L. |
| <i>C. paniculata</i> , L.         | <i>C. acuta</i> , L.     |
| <i>C. echinata</i> , Murr.        | <i>C. vulgaris</i> , Fr. |
| <i>C. leporina</i> , L.           | <i>C. panicea</i> , L.   |
| <i>C. ampullacea</i> , Good.      |                          |

The remarkable abundance of the little *Epilobium nummularifolium*, R. Cunn., on the roadside should also be noted.

## EXCERPTS FROM THE ANNUAL REPORTS OF THE SOCIETY.

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### From the Secretary's Report.

Notwithstanding the fact that 1944 was the fifth year of the war the activities of the Society have been fully maintained. There is now a total membership of 266 (58 women and 208 men). Eleven members are with the Fighting Forces. There are three Honorary Members and ten Life Members.

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### From the Botanical Section Report

(Convener—*Mr Richard Prasher*).

The Botanical Section is able on this occasion to report a year of successful progress and of apparently increasing interest on the part of the members of the Society generally. It is with great satisfaction that we have noted that botanical studies are still attracting a large share of attention, both at the meetings and at the general excursions of the Society. The subject has received attention from many angles on the part of lecturers at our monthly gatherings; and the programme of the Society's outings has had much of a distinctly botanical complexion.

Thirteen excursions on Saturday afternoons were arranged by the Section Committee, all of which were carried out in fine weather. Indeed, the meteorological conditions during last season were the most remarkably favourable which we have experienced for some years past, and the attendance at these excursions was the largest we have been able to record for some time.

The season opened with a visit to the Blae Loch, near Lugton, a favourite haunt of the bryologists to whose particular interests it has been customary to devote the earlier outings each year. On this occasion the outing followed a spell of exceptionally dry weather, with the result that we

found the fringes of the loch to be exceptionally dry, giving easy access to many parts which on other occasions we have had difficulty in reaching. This, however, had the effect of spoiling to some extent the harvest of moss specimens which is generally good. The most striking feature was a development of the moss *Climacium dendroides*—one of the species here found in exceptional abundance. Unlike its usual 'dendroid' character, the moss was seen to be in most cases spreading along the road horizontally, presenting an appearance which quite puzzled the bryologists of the party. During the walk to and from the loch 10 species of flowering plants were noted in bloom.

An announcement of the discovery by one of our members, Mr. Boyd, of a clump of *Gagea lutea* in a wood near Largs a year or two ago led to our arranging an excursion to the coast on 15th April, when, under his guidance, a party of 13 members visited the spot. Unfortunately, the plant was just past flowering; but the occurrence of this species, a rare one in this part of the country, in what seems to be a hitherto unrecorded station, was a matter of special interest to the members. This plant was formerly recorded as found in a Lanarkshire station, but was understood to be extinct in the Clyde area. Its reinstatement in our list is therefore a matter for satisfaction.

At the suggestion of the convener of the Geological Section a series of three excursions was arranged to Murroch Glen, where the geologists have been carrying out a number of explorations, the idea being to add to their observations of its natural features any special botanical items which might appear. These were fixed for dates at different seasons—22nd April, 10th June and 12th August, so as to give results representative of the flora at different periods. All were well attended and proved enjoyable outings; but on all three occasions it was found impracticable to penetrate further than the lower portion of the glen. The list of plants observed on these occasions does not include any item calling for particular notice, the most interesting species being *Agrimonia Eupatoria*, L. (found in considerable abundance)

and a few plants of *Ranunculus hederaceus*, L., growing in a ditch—a plant which now seems to have become rather rare in our district. A number of plants of *Galium uliginosum*, L., found on our third visit, added another item of some importance. On this third occasion also an interesting find at the edge of a corn field, on the return journey, was the Scarlet Pimpernel (*Anagallis arvensis*, L.).

Old favourite localities revisited during the season were Campsie Glen (13th May), Fiddler's Gill (27th May), Bardrain (24th June), Stewarton (19th August) and Mugdock (26th August). These all yielded opportunities of seeing once more the botanical treasures which have been often reported in the past and are still present in their well-known haunts, the most important being perhaps the beautiful display of *Trientalis europæa*, L., at Bardrain.

Following up our work in the Kirkintilloch-Cumbernauld area, which has been engaging the attention of the Section for the past few years, three outings were devoted to that district, and these resulted in our being able to add a number of items to the list. This survey is now completed. (v. Page 1). The list contains a number of items of special importance, and it is hoped our members will be able to make use of it as a basis for further work.

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### From the Microscopical Section Report

(Convener, *Mr. George Maclean*, F.R.M.S.)

The series of informal Lectures, Talks and Demonstrations was continued during Session 1944 by Mr. Gordon Rattray, Ph.C., who gave a comprehensive treatment of the methods employed in the making of permanent microscope preparations. Among other topics, he discussed: The apparatus and equipment required; The killing and fixing of the material; The microtechnique of section cutting, of staining, dehydrating and clearing, and of mounting—temporary and permanent. The lectures were illustrated by demonstrations



and the members had an opportunity of cutting their own sections and of mounting (permanently) their own stained preparations on microscope slides. The meetings were most enthusiastic and Mr. Rattray's efforts and encouragement were greatly appreciated.

Some of the Section's work was on show at the Society's exhibition on June 12th.

---

### From the Entomological Section Report

(Convener, *Mr. T. H. M. Gordon*).

Mr. William Russell has furnished the following notes on **Lepidoptera** :—

A specimen of the Puss Moth (*Dicranura vinula*, Linn.), was found on a neighbour's doorstep in the Newlands district in the month of June. The specimen was in perfect condition, as if newly emerged.

The camouflage and resting place of the Peach Blossom Moth (*Thyatira batis*, Linn.), was observed near Bullwood, Dunoon, in the month of June. The resting place was under the leaf-stalk of the Rhododendron. The moth embraces the stalk, so to speak, making itself look like a thickening of the stalk at its point of attachment to the leaf. This camouflage, as far as Mr. Russell is aware, has not previously been recorded.

Mr Nicol Hopkins has found the Peacock (*Vanessa io*, Linn) the Painted Lady (*V. cardui*, Linn.) and the Red Admiral (*V. atalanta*, Linn.) in greater numbers than usual in the Richmond and Linn Parks. On one occasion, at the beginning of September in the Linn Park, he saw four Red Admirals, three Peacocks and one Tortoiseshell within a yard. It was noted that the White and Yellow Single Dahlias were the favourite flowers for these species to alight on.

The Convener placed on record the following :—

*Dryocoetes autographus*, Ratzburg. Several under Spruce

bark near Eaglesham. This species has only been recorded once before, from Lochgoilhead, Main Argyll.

*Quedius lateralis*, Gravenhorst, taken on two separate occasions in a wood near Croftfoot, Lanarkshire.

*Quedius fumatus*, Stephens. One specimen from Strathblane. This has not been recorded from the Clyde area before.

*Quedius pallipes*, Lucas. (*Q. hammi*anus, Shp.) Added to the Scottish list by Mr. A. Fergusson, F.R.E.S., Scot. Nat., Mar./April, 1933, from Bishopton, Renfrewshire. I have specimens taken at Annan on the Solway.

*Blaps mucronata*, Latruille (The Cellar Beetle). I found a damaged specimen on the pavement, New City Road, last spring.

---

### From the Ornithological Section Report

(Convener, *Mr. T. Robertson*).

This Section carried out as usual a programme of field work during 1944. Castle Semple Loch and its vicinity were the main grounds and, from March to September, monthly visits were made (seven in all). Murroch Glen had three visits which were joint with the Geological and Botanical Sections. Largs, Fiddler's Gill and Bardrain Glen were other places on the list.

Castle Semple Loch and its surroundings, including the drained Barr Loch, are very attractive to a wide range of birds, particularly waterfowl. A list of 61 species was recorded. The following are the more interesting:—

Waterfowl: Pintail, Common Pochard, Goosander, Shoveler, Wigeon, Teal, Mallard and Whooper Swan.

Land Birds: Grasshopper Warbler, Garden Warbler, Yellow Wagtail.

Murroch Glen is so narrow as to be almost a gorge and it is densely overgrown with trees, bushes and lesser vegetation. Thus only a limited number of species can be expected, but nevertheless the total of 31 is quite impressive. The following are outstanding:—

Grey Wagtail, Garden Warbler, Sedge Warbler, Spotted Flycatcher, Common Sandpiper, Goldcrest and Tree Creeper.

Apart from the excursions the customary watch for the arrival of Summer Migrants was maintained. (v. Page 19).

Since June the only unusual bird reported was the Red-backed Shrike (Butcher Bird) in the neighbourhood of Airdrie.

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### From the Geological Section Report

(Convener, *Mr. Wm. J. Cannon*).

A series of very successful meetings was held by the Section during the session. The following papers were read :—

- |                    |   |
|--------------------|---|
| Mr. William Rennie | The History of the Study of Geology in Glasgow.   |
| Miss Craig         | The British Granites.   |
| Mr. Kirkwood       | The Philosophical Implications of Geology.  |
| Mr. Wm. McLean     | The Geology of Northern Ireland.  |
| Mr. Holloway       | Boylestone Quarry. A paper which summarised, to date, the work done by Mr. Holloway and Mr. Stollery. |
| Mr. Stollery       | The Application of Mathematics to Geology.  |
| Mr. Wm. J. Cannon  | The Identification of Sands and Gravels.  |



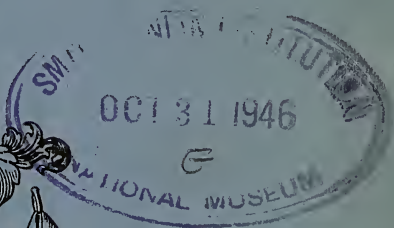
# The Glasgow Naturalist

THE JOURNAL OF THE  
GLASGOW AND ANDERSONIAN NATURAL HISTORY  
AND MICROSCOPICAL SOCIETY

(Including the *Transactions and Proceedings* of the Society)

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Part II.

1946



Edited by  
DONALD PATTON, M.A., B.Sc., Ph.D., F.R.S.E., F.G.S.

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# SUMMARY OF CONTENTS

## PAPERS—

## PAGES

|  |    |
|--|----|
| The Natural History Features of the West of Scotland<br>in Relation to Regional Planning—Compiled by<br>Dr. J. Inglis Cameron ... .. | 37 |
| Some Clydesdale Records of Fungi—By Robert H.<br>Johnstone, M.A. ... ..  | 59 |
| List of First Arrivals of Summer Birds in the Clyde Area<br>in 1945—Compiled by Thomas Robertson ... ..                              | 63 |
| EXCERPT FROM SOCIETY REPORTS ... ..  | 65 |
| SOCIETY EXCURSION REPORTS ... ..   | 66 |
| REPORTS FROM THE SECTIONS ... ..   | 75 |
| DIGEST OF THE PROCEEDINGS OF THE SOCIETY ... ..  | 83 |
| LIST OF MEMBERS ... ..   | 90 |

# The Glasgow Naturalist

The Journal of the  
GLASGOW AND ANDERSONIAN NATURAL HISTORY  
AND MICROSCOPICAL SOCIETY.

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Vol. XV. Part II.

September, 1946

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## \*THE NATURAL HISTORY FEATURES OF THE WEST OF SCOTLAND IN RELATION TO REGIONAL PLANNING

---

OBSERVATIONS BY THE GLASGOW AND ANDERSONIAN NATURAL  
HISTORY AND MICROSCOPICAL SOCIETY.

---

*"Art is the perfection of nature: were the world now  
as it was the sixth day, there were yet a chaos. Nature  
hath made one world, and art another."*

—Sir Thomas Browne (1605-82).

*"What would the world be, once bereft  
Of wet and of wildness? Let them be left,  
O let them be left, wildness and wet;  
Long live the weeds and the wilderness yet."*

—Gerard Manley Hopkins (1844-89).

As citizens, we are bound to extend a warm welcome to the idea of Regional Planning for the West of Scotland. Our people must be better housed and their working conditions improved. This means that the population, both at home and at work, must be spread out over a vastly greater area than at present. With the increase of built-up land, however, there follows a corresponding decrease in the remainder, and

\*Very slightly abridged. Communicated April 15, 1945. Compiled and the main body of the Report prepared by Dr. J. Inglis Cameron,

it is here particularly that, as naturalists, we find the prospects of Planning somewhat disturbing. But we believe that, with the right kind of consideration applied by the Planners to the lay-out of the built-up areas, the adverse effects of Planning on the variety and location of our flora and fauna can be reduced to a minimum.

We therefore commend to the thoughtful consideration of our West of Scotland Planners the two quotations which open this Report. It is in the spirit of these quotations that we offer the following practical observations.

Our interest as naturalists is in the plants; the animals, including of course the birds; and the geological features of the Clyde drainage area. We are anxious that its present rich variety of the commoner species of plants and animals should not, if possible, be reduced. We are also concerned for the preservation of its rarer species to the greatest possible extent. As to the geological features of our region, we would like to see these regarded as amenities, and maintained as such.

We understand that a fundamental principle of all Planning is the creation of four different kinds of zone, viz. : (1) housing, (2) industrial, (3) commercial and (4) agricultural. Land not thus zoned would consist of moorland, hills, etc.; and the zones referred to can be duplicated not once, but many times over. It is of course the agricultural zones and the rest of the countryside—moors, hills, lochs, seashore, etc.—which would be in the main the happy hunting grounds of future naturalists. But we are satisfied that if an endeavour were made to restrict the number of persons per acre in the housing, industrial and commercial zones, the flora and fauna of the region as a whole would be favourably affected. Large gardens with trees (which must not be too near buildings), tree-lined roads and streets, trees planted or grown in the form of smaller or larger woods within the built-up areas would all do much to maintain if not to increase the variety of plant, bird and other animal life.

Based on the point of view of the birds themselves, the following classification of bird habitats may be of some interest and value to our Planners.

## A. Woodland.

- (1) Coniferous.
- (2) Deciduous.
- (3) Mixed.

## B. Park or Garden Land.

- (1) Parkland.
- (2) Orchards.
- (3) Gardens.

## C. Agricultural Land.

- (1) Allotments, etc.
- (2) Arable Land.
- (3) Grass Land.

## D. Heath and Moor.

- (1) Lowland.
- (2) Upland.

## E. Alpine.

- (1) Mountain tops.

## F. Water Land.

- (1) Flowing—(burns and rivers).
- (2) Placid—(ponds and lochs).
- (3) Stagnant—(mosses, bogs, marshes, etc.).

## G. Coast Land.

- (1) Salt Marshes.
- (2) Dunes.
- (3) Beaches.
- (4) Cliffs.

## H. Man-Land.

- (1) Built-up areas.

This classification is adopted with slight modifications from Fisher's "Watching Birds."

As naturalists, we would like to preserve or secure the largest possible number of habitats A. to G. inclusive. While these habitats are of equal interest to botanists, ornithologists, entomologists, etc., a few general observations from the point of view of the botanist may be added. Hedgerows (hedges and ditches) and embankments (railway and other) are favourite haunts of those interested in plant life. So too is waste land, which need not of itself spoil the amenities of a district, so



long as its borders are æsthetically defined and plant life encouraged to grow thereon.

A word or two on the subject of access and amenity! We are anxious that facilities for the study of natural history on the above lines should be available to the public throughout the West of Scotland. We would therefore like to see these habitats as evenly distributed throughout the region as may be; but, in addition, we would plead for the greatest possible opportunities for access to such spots. Moreover, we feel that the deliberate preservation of these areas calls for their maintenance in an æsthetically satisfactory condition by the authorities concerned.

We have recently taken an active part in the formation of a West of Scotland Field Studies Council, a body which, it is hoped, will be widely representative of various interests and which will be able to take wide views of the measures needed for the encouragement of natural history and allied subjects in the Clyde area. We feel that the Council, which, by the way, includes representatives of archaeological interests, might have some valuable suggestions to make to our Regional Planners if invited to do so.

So far we have referred to plant and animal habitats not classified as nature reserves either local or national. If such reserves, however, could be established in the West of Scotland area they would certainly have our warm approval. The Planners are no doubt familiar with the Report on "Nature Conservation and Nature Reserves" (Cambridge University Press), published by the British Ecological Society in 1943. There is much in this Report which, in our opinion, would merit the Planner's sympathetic consideration.

We conclude with (1) a list of Favourite Resorts of Naturalists in the West of Scotland; (2) a Summary of the foregoing general observations; and (3) a series of Appendices including Sectional Reports. The information on which the list of Resorts has been prepared is drawn mainly from the contents of the said Reports.

We are extremely grateful to the Clyde Valley Regional Planning Advisory Commissioners who have invited us to offer these remarks, and shall at any time be pleased to furnish them with such additional information and help as they may desire.

# FAVOURITE RESORTS OF NATURALISTS IN THE WEST OF SCOTLAND.

## River Clyde and Tributaries above Glasgow.

Valley of the River Clyde and its tributaries, including the Nethan, Mouse, Fiddler's Burn, etc. (The Orchard Country.)

Gorge of the Avon with its tributary the Cander.

## Inland: North of River Clyde.

The entire Loch Lomond area, including the Alpine region in its Northern part.

The Endrick and Blane river regions.

Ballagan and Campsie Glens.

The Fintry Valley.

Corrie Burn.

Flanders Moss.

Aberfoyle and Lake of Menteith district.

District between Milngavie and Strathblane West to Craigallian. (Allander Valley.)

Kilpatrick Hills (especially Southern slopes).

Possil Marsh.

Cadder Wilderness.

Banks of River Kelvin.

Fairy Glen, Airdrie.

## Inland: South of River Clyde.

Banks of River Cart.

Mearns Moor.

Waulkmill Glen.

Loch Libo, Renfrewshire, and Loch Liboside Hills.

Castle Semple Loch and Barr Loch (Drained).

## Firth of Clyde and Sea Lochs.

Hills around Kyles of Bute, especially Northern part of the Island of Bute and the woods around Lochs Riddon and Striven.

The Clyde Islands. (Bute, Arran and the Cumbraes.)

Ayrshire coast, especially sand dunes between Prestwick and Troon, and Troon and Irvine.

Seashore from Seamill to Fairlie, particularly around Portincross. (Built-up Esplanades would be particularly disastrous.)

Noddsdale Burn and Brisbane Valley behind Largs.

Woods and glens from Fairlie Southwards.

Woods and glens between Largs and Skelmorlie.

Hills behind Greenock.

Garelochhead.

#### SUMMARY.

Nature and Art have each made and are ever making a World of their own. Art, in this sense at least, is the perfecting of Nature. Let them be left, Wildness and Wet. Long live the Weeds and the Wilderness. In these four sentences lies the keynote of our general observations. Our practical recommendations are as follows :

A. Let us have (1) a World of Art to satisfy the clamant housing and working needs of our People; (2) a World of Nature, distinct and apart from the World of Art, not merely to satisfy their æsthetic and spiritual needs, but also to maintain the wealth and variety of our flora and fauna; and (3) isolated fragments of the World of Nature, scattered throughout the World of Art as evenly and generously as may be; these last to serve similar purposes, though in a slightly different way, to those mentioned in (2).

B. We ask that special consideration be given to each of the entries on our list of the Favourite Resorts of Naturalists in the West of Scotland.

It only remains to add that the aim of everyone, Planners and People alike, should be to make both Worlds as beautiful as possible—and to keep them so.

J. DUNCAN LESLIE, *President.*

JEAN C. D. CRAIG, B.Sc., *Hon. Secretary.*

J. INGLIS CAMERON, M.B., F.R.F.P.S.Glasg.,

*Convener of Planning Report Committee.*

April, 1945.

## APPENDICES.

## A. BOTANICAL SECTION REPORT.

(Convener: Mr. Richard Prasher, 19 Peesweep Row, Dalry.) Prepared by Mr. John R. Lee and Mr. Prasher.

The activities of this Society having been largely concerned with the natural features of the area embraced by the drainage of the river and firth of the Clyde, and that part of the upper reaches of the Forth which (so to speak) intersects and overlaps the northern tributaries of the Clyde, it is natural that the considerable extension of building and industrial development at present under contemplation presents a number of questions of vital interest to us. The effects of any extensive spread of industrial or urban areas within the boundaries of the district may result in the complete destruction of some features which have long been of special interest to us, and in any case will almost certainly be the cause of alterations which will greatly modify the conditions affecting the growth and distribution of the vegetation of the area.

With some of these questions it is impossible to do more than state the facts, with an expression of something like regret that nothing can be done to stay the inevitable march of events. Many rare and extremely interesting plant species occur at particular points where they have persisted for a long time, but where their continued existence has been frankly recognised to be precarious. Such occurrences are of first class interest; but all that can be said on the matter is that any attempt at their preservation would very probably result only in hastening the destruction it is desired to prevent.

Excluding the consideration of such special cases, however, we may point out that there are a number of more or less extensive areas which are of great botanical interest, not merely because of the occurrence within them of specially rare or important species, but for the reason that they present features of vegetation of value to the student of nature, the destruction or material alteration of which would deprive us of much that is of vital importance in furthering the studies which it is the object of our Society to assist and encourage.



In calling attention to some of these special areas, we would begin by emphasising particularly the entire Loch Lomond area. It is not alone because of its unique scenic beauty that Loch Lomond is of importance to the people of the West of Scotland; the whole area, comprising as it does features of mountain, river, lake and island landscape, constitutes an almost unequalled field for the study and observation of natural history. To the botanist it presents one of the most compact districts for research in Britain, the different types of plant community—woodlands of various kinds, marsh-land, bog and heath, besides a great variety of aquatic and semi-aquatic plants, and—especially on the islands—many unusual groupings of the flora, and, above all, an “alpine” area of exceptional interest on the mountains around its northern part, being particularly noteworthy. Any interference with this delectable ground would deprive the West of Scotland botanist of many facilities quite irreplaceable.

Correlated with the Loch Lomond area itself, mention may be made of the rivers flowing into it from the east—the Endrick and the Blane—together with the hilly ground from which their sources are drawn, the Campsie Fells. The Fintry Valley, in the heart of the district, and the Blane Valley, on its southern flank, are both rich in features of botanical interest, particularly the smaller glens and corries in which a great variety of plant forms abound, many of them, especially of the lower and simpler types, of special value to the student. In this region, however, the interest is perhaps more particularly in the higher parts of the ground.

Northward of this, however, and lying partly in the drainage area of the Forth, there is a district of extreme interest to the botanist. This is the western extremity of the extensive bog-land known as the Flanders Moss. This has long been known to be the habitat of some of our most attractive plants, amongst them species of extreme rarity, the loss of which would be exceedingly regrettable. Farther to the north of this locality is what may be called, in general terms, the Aberfoyle district. This area, including all the ground from the Lake of Menteith westwards to the flanks

of Ben Lomond, with the chain of lochs forming the sources of the Forth, as well as the equally interesting district of the Trossachs on its northern side, constitutes one of the richest parts of the central highlands from our point of view—second only to the region of Breadalbane farther to the North.

Coming now to parts of our area a little nearer home, and perhaps next in importance to the Loch Lomond district, we would mention the upper reaches of the valley of the Clyde itself.

Throughout the greater part of its course the steep ground flanking the river on both sides has long been famous as the "Orchard Country," market gardening being one of its leading industries. Here, in spite of (perhaps partly in consequence of) the intensive cultivation, the plant life of the district is particularly rich. This is especially so in regard to many of the minor streams which flow into the Clyde, the deep glens of which, such as those of the Nethan, the Mouse, the Fiddler's Burn and others, are the habitat of many of our rarer species.

Another similar river area is the deep gorge of the Avon, with its tributary the Cander, both almost as rich as the Valley of the Clyde itself.

There are also many parts near the coast of the Firth of Clyde to which attention may be drawn. Areas like the hills around the Kyles of Bute, especially the northern part of the island of Bute itself, and the woods around Loch Riddon and Loch Striven, are all of very great interest to the botanist.

As to the vegetation of the shore also, there are many localities which are specially important, particularly on the Ayrshire coast, where many interesting plants are found. We would specially mention the extensive sand-dunes between Prestwick and Troon; and further north between the latter town and Irvine; and also the stretch of sea-shore from Seamill north to Fairlie, particularly around the headland at Portincross. This ground is of special interest, as affording perhaps the best area of sea-shore vegetation which we have on the Clyde coast. It may be of special interest at the present time to mention that the shore near Seamill provides

one of the most important localities for the study of the seaweed flora of the littoral zone, the importance of which has of late attracted a good deal of attention.

In this same region, there are several deep glens cut by the smaller streams entering the Firth from the hills adjoining. The valley of the Noddsdale Burn, for example, known locally as the Brisbane Valley, behind Largs, is a particularly rich botanical ground, which might be seriously affected by any extensive enlargement of the urban area; and the same is true with reference to the woods and glens below Fairlie, and also to the north between Largs and Skelmorlie.

The localities indicated are those of more general importance from our standpoint; but there are many more restricted areas to which we should like to direct attention. Of these one may speak more particularly of some well-known places to which students of our flora have long paid frequent visits at different seasons of the year for the purpose of observing the succession of plant development. There is, of course, the locality close to the city known as Possil Marsh, which is not only rich in its variety of the ordinary marshland vegetation, but also affords a habitat for a very considerable number of the rarer species only occasionally seen. This, however, although most important from its location so close to the city, is only one of a number of similar places, such as the smaller lochs of the Mearns moors, and further west on the hills behind Greenock. We would specially mention also Loch Libo in Renfrewshire, which, with its surrounding area of marsh and bog, constitutes one of the most interesting localities within easy reach of Glasgow.

Nearer hand still, to the north of the city, the district around Milngavie, particularly the part between that town and Strathblane, and westwards to Craigallian, is an area specially attractive.

#### B. ORNITHOLOGICAL SECTION REPORT.

(Convener: Mr. Thomas Robertson, 8 Hillside Avenue, Clarkston.) Prepared by Mr. Thomas Robertson,



*Areas, Usually of Considerable Extent, at Some Distance  
from Glasgow.*

*Loch Lomond Area.*

As a single area comparatively unspoiled at present this is the first choice for preservation. The bird population is large. The total of species recorded is close on 200 (cf. this with the figure of 250 species for the Clyde area as a whole), of which about 120 may be counted as nesting or visiting every year during winter or on migration. The remainder taper off from fairly common in some years to single occurrences, some of them old records and some dubious. The high hills at the northern end of the loch give shelter to the wilder species, while on the cultivated lands and sheltered wood at the lower end a multitude of the less shy birds are to be found.

In winter the loch itself is the home of many kinds of duck, with wild swans and occasionally geese. The variety of wild fowl is very great. As a sporting field it is not much frequented, the birds being shy and not easily approached.

In the breeding season the islands of the loch are full of interest. The low marshy ground round the mouth of the Endrick is a favourite resort of many waders, and here have been shot the Wood Sandpiper, Greenshank, Knot, Little Stint and Black-tailed Godwit—all rare in the West of Scotland.

*Kyles of Bute Area, including North Bute, Loch Riddon  
and Loch Striven.*

This area surpasses even Loch Lomond as a field for the bird lover, but owing to its comparatively inaccessible situation it has been placed second on the list. The total number of species is again around 200, but some 150 may be counted as nesting or visiting regularly, while the odd occurrences are fewer, this being partly because fewer observers regularly frequent the area.

The birds which nest only beside the sea increase the interest here, while other sea-birds, which nest on Ailsa Craig or elsewhere, are regular visitors. Several rather rare species nest in the hills around,



The naturally sown woods, which cover a good deal of the lower ground, are a paradise for many species. The Bullfinch, Lesser Redpoll, Redstart, Long-tailed Tit and Wood Warbler—all rare in the greater part of the Clyde Area—are common here.

*Portincross to Fairlie.*

This is one of the few areas on the Ayrshire Coast where no road runs close to the sea and there is no golf course to bring people about. The result is that this corner is comparatively secluded, and large numbers of birds are to be seen, especially during the autumn and spring migrations. The main feature attractive to birds is the large expanse of sand and mud stretching for miles at every low tide. Most species of duck, several kinds of geese and a long list of wading birds constitute the chief interest. A fair number of land birds are also to be seen.

*The Island of Bute.*

This island has such a variety of landscape that every type of bird can find a suitable habitat. The result is that not only is the list of species large, but the number of individual birds is very great. Mr. McWilliam ("The Birds of the Island of Bute," Witherby, 1927) estimates that in autumn there may be four hundred thousand birds on Bute. He lists 168 species, of which about 100 nest. Several new records since 1927 increase the total. By visiting shore, woodland, moor and loch in the course of a walk of only two or three hours, as can be done in several parts of the island, a good observer can note about 50 species. In the course of a single day in May or June more than 80 species have quite often been seen. This is a feat almost impossible to equal in any other part of the Clyde Area.

Owing to restrictions imposed up till now by the landowner, there is only one large centre of population (Rothesay). A great deal of the charm and much of the interest to naturalists would vanish if unrestricted house building took place all over the island. The west side at least should be left in its present state.

*The Clyde Valley around Lanark, including the Valleys of the Nethan, Mouse and Fiddler. (The Orchard Country.)*

While this is a large area, the lack of lochs and its distance from the sea mean that many species will not be found. Nevertheless there is a quite long and interesting list of over 100 species. A number of rare birds are recorded, and quite a few of the less common breeding birds nest in the district.

The sheltered and wooded valleys and hollows support an abundance of individual birds. A walk in the "Orchard Country" in the Spring has been a relaxation for the jaded Glaswegian for at least half a century.

*Aberfoyle District.*

Its delightful surroundings make an outing in the Aberfoyle district an event to be looked forward to and remembered afterwards. There is an interesting variety of bird-life here, of which the Capercaillie is noteworthy to the Southerner. The Buzzard comes down on occasion from the mountains round about. There is no list of the birds of this district available, but the great extent of wooded ground, combined with loch, moor and hill ensures a large number of species, and the individual birds are very numerous.

*Other Areas*

Deserving attention are the Brisbane Glen at Largs, which is in immediate danger of being ruined from the naturalist's point of view, and Fairlie Glen.

*Areas Comparatively Close to Glasgow.*

*Allander Valley and Ground from Mugdock to Strathblane.*

This is the finest piece of countryside within easy reach of Glasgow. It is unrivalled as a training ground for the embryo ornithologist, for most of the common species inhabiting the inland parts of the Clyde Valley are to be found within the area. A young bird watcher would need to make many visits before he could say that he was familiar with most of the species.

The older naturalists have for generations frequented the district, which is easily reached from Glasgow and yet has such charm in its amazing diversity of surface and scenery. Suitable habitats for almost every type of bird, except purely sea-birds, are located within its borders.

*Castle Semple Loch and Barr Loch (drained).*

This is one of the favourite winter resting places for water fowl. It attracts a greater variety and greater numbers than any other sheet of fresh water, excepting Loch Lomond, within 20 miles of Glasgow. There is a flock of Whooper Swans, which remains until April, and sometimes several Bewick's Swans as well as a flock of Mute Swans. Most of the species of duck known in the Clyde Area have been recorded. There is an abundance of the commoner land birds round the margins, as well as two or three rather scarce breeding species.

The fact that two railway lines enclose the area and leave nowhere any large margin of land means that preservation is comparatively simple.

*Mearns Moors.*

The rough land lying some two miles south of Newton Mearns is another favourite haunt of Glasgow ornithologists. Just over half an hour's bus run from the centre of Glasgow, this area holds all the typical moorland birds. The Golden Plover, Dunlin, Curlew, Redshank, Common Sandpiper and Snipe all nest. Black-headed Gulls breed on several of the islands and marshy places in the lochs, as well as a few Terns. The Great Crested Grebe and Little Grebe are also residents. Among the ducks the Shoveler, Tufted Duck, Teal and Mallard nest, and several other species are to be seen in winter. The Sparrow Hawk, Kestrel, Carrion Crow, Long-eared Owl and Tawny Owl are other rather uncommon breeding species.

*Loch Libo and Loch Liboside Hills.*

Loch Libo is a small sheet of water, but its setting under a wooded slope is very good. It is visited by a surprising number of duck, with an occasional wild swan or goose. In the breeding season there are nests of the Coot, Waterhen, Mallard, Tufted Duck and Teal, with usually one pair of

Mute Swans. The Snipe, Redshank and Common Sandpiper breed on the immediate borders, and among the woods and bushes are to be found the nests of the Sedge Warbler, Garden Warbler, Willow Warbler, Spotted Flycatcher and of many species of common birds. The loch, with the slopes above it, is separated by a railway line from the rest of the valley and the village of Uplawmoor.

### C. GEOLOGICAL SECTION REPORT.

(Convener: Mr. William J. Cannon, 17 Bassett Crescent, W.3.) Prepared by Mr. William J. Cannon.

As geologists we are interested not merely in the rocks themselves, but in the rock and landscape formations and the scenic grandeur of the West of Scotland. In framing this Report we should have liked to have had more details regarding the lines on which the Regional Planning of the Clyde area is to be carried out. We realise that once a rock formation is blasted or a beauty spot built over, it is gone for ever. Therefore, although we are as passionately desirous as any that the Regional Plan should be a success, we view future developments not without some anxiety. The request, however, for this Report gives us some hope that these important facts will be considered during the actual course of building operations. The past has not been without its errors, hence, doubtless, the proposals for Regional Planning in principle. We are anxious that as many as possible of these tragic mistakes should be avoided. To preserve the Campsie Glen for example, but, at the same time, to build a row of houses at the top of each bank, would be worse than useless.

The following are a few of the spots in the West of Scotland which, in our view, deserve special consideration, not, merely on account of their geological features, but because of the beauty and interest of their landscape formations. For convenience we have put these down in tabular form.



TABLE I.

| <i>Locus.</i>  |       |       |       | <i>Reasons for Special<br/>Consideration.</i>                               |
|--|-------|-------|-------|---|
| Corrie Glen  | ..... | ..... | ..... | Exposures of limestones (fossils).  |
| Ballagan Glen  | ..... | ..... | ..... | Famous exposure of cementstones.  |
| *The Kilpatrick Hills                                    | ..... | ..... | ..... | Exposures of zeolites, and beauty.  |
| (Entire if possible. Southern slopes must be preserved.) |       |       |       |   |
| Campsie Glen   | ..... | ..... | ..... | Beauty, etc.  |
| Loch Lomond District                                     | ..... | ..... | ..... | Beauty, etc.  |
| Waulkmill Glen   | ..... | ..... | ..... | Limestone fossils (particularly Edmondia punctatella, not found elsewhere). |
| (Can be preserved with Gorbals Water Works.)             |       |       |       |   |
| Loch Libo  | ..... | ..... | ..... | Beauty, etc.  |
| Fairy Glen, Airdrie                                      | ..... | ..... | ..... | Beauty in an area where this is very rare.                                  |
| Banks of River Cart                                      | ..... | ..... | ..... | Beauty.   |

(These call for the same type of consideration as has already been given to the banks of the River Kelvin.)

|                       |       |       |       |         |
|-----------------------|-------|-------|-------|---------|
| Banks of River Kelvin | ..... | ..... | ..... | Beauty. |
|-----------------------|-------|-------|-------|---------|

(The efforts to date to preserve the amenities of these should be extended to cover a much greater area of the river's reach than at present.)

\*Especially Murroch, Auchentorlie and Arbuck Glens, Langcraigs, and the area between Greenland Farm and the River Clyde (as this area contains possibly the finest collection of cup-and-ring markings in the neighbourhood; a fragment of a vitrified fort; and a magnificent view of the valley of the Clyde). We suggest retention of Edinbarnet estate with Lochs Cochno, Greenside and Humphrey as a large park. All three of these lochs are now utilised as waterworks and would be better retained in one than as scattered parks.

Certain of the foregoing areas and others of archaeological and historic interest are in process of being destroyed, and immediate intervention is necessary.

(1) The grounds enclosing the Langcraigs have been purchased by a Glasgow firm of builders for the construction of a housing scheme.

(2) A housing scheme is in existence in the area of the Lochs Cochno, Greenside and Humphrey, and will be extended northwards.

(3) The ground containing the pre-historic remains known as the Druid's Temple at Nappers, near Drumchapel, has been purchased and building is to commence on the cessation of hostilities. Drumry Castle (damaged in the blitz) is also threatened in this latter scheme.

(4) The Roman Wall, Forts and Military Way are still preserved in short disjointed sections across the midland valley, but many of these are threatened while others have been already partially destroyed. Every single fragment of this ancient military defence line should be preserved, and where necessary restored. Some of the forts, *e.g.*, Balmuldy and Barrhill, after excavation were filled in again with rubble. These should be re-excavated and preserved as ancient monuments.

The destruction of a section of the Roman ditch or moat built as part of the outer defences of Antonine's Wall is imminent. This section, beautifully preserved, is to be seen at Thorn Farm, almost exactly half a mile west of Bearsden. A housing scheme is approaching the site of the wall by two spear-heads—from the north-east and south-west. The danger, however, lies mainly in the former, and so fast has

been the advance from this direction that the ditch is already crowded, and the filling in of this relic of antiquity, dating from the year 140 A.D., is impending.

#### D. ENTOMOLOGICAL SECTION REPORT.

(Convener: Mr. Thomas H. M. Gordon, 71 Croftmount Avenue, S.4.) Prepared by Mr. Thomas H. M. Gordon.

TABLE II.

##### *Class Insecta*

Loch Lomond, Part of Dunbartonshire Lying Between  
Loch Lomond and Loch Long, Ben Lomond, Flanders  
Moss Area, Fintry and Strathblane.

| Order                            | Hymenoptera | Lepidoptera | Coleoptera | Diptera | Total |
|----------------------------------|-------------|-------------|------------|---------|-------|
| Ardlui .....                     | —           | 11          | 16         | —       | 27    |
| Arrochar .....                   | 11          | 31          | 14         | 8       | 64    |
| Garelochhead .....               | 1           | 110         | 21         | —       | 132   |
| Luss .....                       | 17          | 70          | 21         | 1       | 109   |
| Rowardennan .....                | 1           | 3           | 18         | 1       | 23    |
| Glen Falloch .....               | 5           | 7           | 2          | 22      | 36    |
| Ben Lomond .....                 | —           | 4           | 28         | —       | 32    |
| Loch Lomond and<br>Islands ..... | —           | 10          | 7          | 3       | 20    |
| Inveruglas .....                 | 1           | 25          | —          | 4       | 30    |
| Drymen .....                     | —           | 1           | 4          | —       | 5     |
| Fintry .....                     | —           | 33          | —          | —       | 33    |
| Strathblane .....                | 7           | 3           | 3          | 46      | 59    |
|                                  | —           | —           | —          | —       | —     |
| Total .....                      | 43          | 308         | 134        | 85      | 570   |

The above area has produced the only records in the British Association's Handbook (Flora and Fauna of the Clyde Area), 1901, the following number of times:—

|   |    |
|---|----|
| Order—Hymenoptera (Bees, Wasps, Ants, etc.) ..... | 25 |
| Lepidoptera (Butterflies, Moths) .....            | 80 |
| Coleoptera (Beetles, Weevils) .....               | 5  |
| Diptera (Two-winged Flies) .....                  | 33 |

---

|             |     |
|-------------|-----|
| Total ..... | 143 |
|-------------|-----|

To have reasonable hope of preservation, an area must prove to have some definite natural history value to the public.

This report is written from the point of view of those interested in one or more of the many branches of study into which the Insect life of this country is divided.

It is true in general, that an area good, and therefore desirable for preservation from the Botanist's point of view, is equally desirable from the Entomologist's.

The difficulty, however, is to produce evidence intelligible and convincing to those not particularly interested in natural science.

We judge a place by what is, or has been, found there. The only method we know of finding out what has, or has not been found in our area, is by consulting the British Association's Handbook ("Flora and Fauna of the Clyde Area, 1901"), and, so far as the Coleoptera are concerned, by noting such additions to the Clyde Card Catalogue as have been since recorded.

In the case of the Hymenoptera, Lepidoptera, Diptera, etc., we have no separate data giving additions, and the evidence which follows is taken entirely from the "1901 Flora and Fauna."

It should be understood that quite a large number of species of Insects are included in the various sectional lists as abundant, common, generally distributed, fairly common, etc., without any reference to specific localities. None of these species has been included in this survey, although a large proportion of them are undoubtedly taken in the areas with which we are dealing.

We have not had the time we should have liked to go into the merits of each locality mentioned, but the Reports of the other sections cover some common ground.

We shall now consider what we are able to show, in the way of definite proof that Loch Lomond, the part of the County of Dunbarton which lies between Loch Lomond and Loch Long, Ben Lomond, Flanders Moss area, Fintry and Strathblane have produced.

We have listed twelve places within this area, and have taken the number of times each place has been mentioned



for Hymenoptera, Lepidoptera, Coleoptera and Diptera. There are of course many other Insect orders but we have not had time to go into these.

Several places will be seen from our table to be extremely rich in some particular branch, such as Garelochhead, with no less than 110 mentions for Lepidoptera.

Luss will be noted as a good place for several other groups, being mentioned 17 times for Hymenoptera, 70 for Lepidoptera and 21 for Coleoptera.

The Dipterist would seem to be specially favoured in Glen Falloch (mentioned 22 times) and Strathblane (mentioned 46 times).

Taking the twelve places as being representative of the area, we find 43 mentions for Hymenoptera, 308 for Lepidoptera, 134 for Coleoptera and 85 for Diptera—a total for the four groups of 570.

There are of course a good many other scattered references in the "1901 Flora and Fauna" to other places within our area. We have dealt with only twelve of the principal places.

In a good many cases, the species referred to in the Catalogue were extremely rare. We find, in fact, that the Loch Lomond area produced the only record or records in Hymenoptera 25 times, Lepidoptera 80 times, Coleoptera 5 times and Diptera 33 times, so that altogether this area produced the only record or records 143 times. A few were new to Britain when first taken.

We think it will be seen from the evidence produced here, that from an Entomological point of view it is very desirable to preserve as much as possible of the area indicated. We hope that with the other sectional Reports we have collectively been able to put forward a good case.

#### *Possil Marsh and Cadder Wilderness.*

The last area under review was situated at some distance from the main centres of population—a fortunate circumstance where preservation is desired.

Possil Marsh and Cadder Wilderness, fortunately in some respects and unfortunately in others, are easily reached by

tram from the centre of the city and have long been the hunting ground of those interested in many branches of Natural History.

The Marsh itself is now a bird sanctuary, which may not improve it from the entomologist's point of view.

This area together with Cadder Wilderness, situated almost side by side along the Forth and Clyde Canal near Lambhill, has produced a great number of species of insects, as will be seen from the "1901 Flora and Fauna" of the Clyde area.

TABLE III.

*Class Insecta.*

| Order              | Hymeno-<br>ptera | Lepido-<br>ptera | Coleoptera | Diptera | Total |
|--------------------|------------------|------------------|------------|---------|-------|
| Possil Marsh ..... | 6                | 36               | 82         | 16      | 140   |
| Cadder Wilderness  | 11               | 75               | 8          | 54      | 148   |
| Totals .....       | 17               | 111              | 90         | 70      | 288   |

The *Glasgow Naturalist*, Vol. XI., April, 1933, contained a valuable contribution to our knowledge of the worth of Possil Marsh to anyone interested in aquatic Beetles. In this Mr. A. Fergusson, F.R.E.S., lists 52 species and varieties for the Marsh, taken by himself, Prof. Balfour-Browne and others.

We cannot see how we can do other than press for the preservation of this small area which has been for so long the haunt of Entomologists and others interested in nature.

*Area between Carluke and Lanark, including  
Cleghorn Glen.*

We find that this area has been referred to 103 times for Lepidoptera, 58 times for Coleoptera—a total of 161 times for these two groups. We do not know why our Hymenopterists and Dipterists have left this area alone, but so it would seem by the absence of definite records.

Cleghorn Glen has special claims to preservation from the Coleopterist's point of view.

We have only some six species of Longhorn Beetles really native to the Clyde area, only two of which are in the least

common. Three of the remaining four have been taken in Cleghorn Glen, and one there only. This place, together with Cartland Crag, also within the area, has produced many records of Spiders which though strictly not insects we include here as a matter of convenience.

*West Kilbride—Fairlie Area and The Cumbraes.*

We should have liked to deal with Arran which has produced some of our finest records in Coléoptera, including quite a few taken nowhere else within the Clyde Area. We leave it out because it does not seem to be in such immediate danger of industrial development."

We surely have the right to claim that some small maritime portion of the Clyde area should be left alone.

The portion West Kilbride, Portincross to Fairlie, is chosen partly on account of the fact that it has escaped building operations so far, which is more than can be said for the rest of the Ayrshire Coast, and partly on account of what it has produced Entomologically.

This district, taken as a whole, is mentioned seven times for Hymenoptera, 28 for Lepidoptera, 15 for Coleoptera and 19 for Diptera—a total of 69 times.

Within this area are to be found many of the species peculiar to a sandy locality. Moreover, the Cumbraes have produced a good many more species of Coleoptera than those mentioned in the "1901 Flora and Fauna," including one or two species taken nowhere else in the Clyde Area.

These areas, Loch Lomond and neighbourhood; Possil Marsh and Cadder Wilderness; that between Carluke and Lanark, with Cleghorn Glen and Cartland Crag; and West Kilbride to Fairlie; and the Cumbraes; are the only ones we have had the time and the material to work on.

There are several other places we should have liked to include. Some are included in the Reports of other sections, however, and thus have their claim to preservation put forward.

## SOME CLYDESDALE RECORDS OF FUNGI

BY ROBERT H. JOHNSTONE, M.A.

Delivered 13th November, 1945.

Abbreviations used:—

- T.B.M.S. —Transactions of the British Mycological Society.  
 T.C.S.S. —Transactions of the Cryptogamic Society of Scotland.  
 B.A.H. 1901—British Association Handbook, 1901, Flora, Fauna and Geology of the Clyde Area.  
 C.C.C. —Clyde Card Catalogue.

To the student of Natural History, working in the Clyde Area, the B.A.H. 1901 is a very interesting volume containing much information of a helpful nature. What it does not contain I found to be almost as interesting, and this induced me to go through my notes for the last ten years and compare them carefully with the B.A.H. 1901 list. This comparison led to search into other records, and I examined the lists of forays of the British Mycological Society (1899-1938) and of the Cryptogamic Society of Scotland (1903-1938). I also made search through the Clyde Card Catalogue. Whether there remain any other publications I am not sure. The result of my labours led me to believe that several species of Hymenomycetes required to be added to the records for the Clyde Area. They are as follow:—

| Name  | Locality       | Date       |
|---|----------------|------------|
| * <i>Stropharia Caput-Medusa</i> , Fr.              | Linn Park,     | 7/10/1944  |
| * <i>Clytocybe pseudoconglobata</i> ,<br>Rea.       | Cadzow,        | 20/10/1938 |
| * <i>C. cartilaginea</i> , (Bull. not Fr.)<br>Bres. | Balloch,       | 19/9/1944  |
| <i>Hygrophorus obrusseus</i> , Fr. ....             | Cadzow,        | 11/9/1942  |
| * <i>Collybia leucomyosotis</i> , Cke &<br>Sm.      | Dougalston,    | 21/7/1945  |
| * <i>Psilo-cybe uda</i> , (Pers.) Fr. ....          | Dougalston,    | 21/7/1945  |
| * <i>Mycena inclinata</i> , Fr. ....                | Glenarbuck,    | 12/10/1940 |
| * <i>Marasmius oreadoides</i> , (Pers.)<br>Fr.      | Balloch,       | 10/9/1944  |
| * <i>Polyporus stipticus</i> , (Pers.) Fr.          | Cadzow,        | 14/9/1945  |
| * <i>Radulum molare</i> , Fr. ...                   | Scotstounhill, | 25/11/1944 |
| <i>Clavaria stricta</i> , (Pers.) Fr. ...           | Cadzow,        | 11/9/1942  |



\* These specimens were submitted to Mr. A. A. Pearson, F.L.S., of the British Mycological Society, who kindly supplied or confirmed the identification.

Some short notes on certain of these specimens may not be without interest.

*Stropharia Caput-Medusa.*

This is a very rare species. In his "British Fungi," 1886, Rev. John Stevenson states: "This very interesting species has appeared in the only British station in the years 1874, 1875, 1883." The station in question was at Glamis. It has since been recorded in the T.B.M.S. for three separate stations in England, in 1910, 1912, and 1923. There is no mention of it in any later forays.

*Clytocibe pseudoconglobata.*

"This species has the same macroscopic characters as *C. conglobata*, (Vitt) Bres., but differs in the white oblong spores with an oblique operculus 9-11 x 3.5  $\mu$

T.B.M.S. xii. 214.

*Hygrophorus obrusseus.*

This was first observed on 11/9/1942. It was seen again in September 1943, but has not been observed since.

*Marasmius oreadoides.*

This was found growing on a compost heap of leaf mould in Loch Lomond Park at Balloch. On visiting the station this year I found that the heap had been removed. This is unfortunate, since Mr. Pearson informs me that this formed a new British record. If the compost has not been dug in too deeply it may be that the species will make its appearance later in some other place.

*Radulum molare.*

The station for this species has unfortunately also been destroyed. The fungus was growing on a dead birch which has been cut down and carted away for fuel.

*Clavaria stricta.*

This was first observed on 5/9/1942. It was seen again on 11/9/1943, but on two visits in September 1944 there was no trace of it.

In addition to the above there are other species which, while already recorded for the Clyde area, are infrequently met with.

*Lepiota acutesquamosa.*

On 9/10/1944 a specimen was gathered on a cinder path in a garden at Scotstounhill. In B.A.H., 1901, it is recorded for Kelvingrove and Paisley. There is no record of it in the T.C.S.S. though it has been noted on nine occasions, all of them in England in the T.B.M.S. The Scotstounhill station has been kept under observation during the present year, but the *Lepiota* has not made its appearance.

*Strobilomyces strobilaceus.*

This was recorded from Perthshire in 1900 in the T.B.M.S. It is in the C.C.C. for 1906, I think for Cadzow. On 7/9/1937 it was again seen at Cadzow, and has been sought every year since without success until this year, when a fine specimen was obtained on 25th August, within a few yards of the spot where the 1937 specimen was gathered. Cadzow was visited again on 22/9/1945, when the decayed remains of the August specimen were seen. It will be noted that the end of August or beginning of September is the time of maturity of the fungus. The absence of any specimens on visits between 1937 and 1945, I am inclined to believe, was due to the lateness of the visits.

The fungus takes its name from the remarkable scales on its cap suggestive of the imbricate scales on a fir cone.

*Polystictus abietinus.*

This was secured at Kelburn, Largs, Ayrshire, on 26/9/1944. It is recorded in the C.C.C. for Cadder, though I have not seen it there. It is said to be a species common in fir woods, which makes it all the more strange that it is not in the B.A.H., 1901,

*Bolbitius fragilis.*

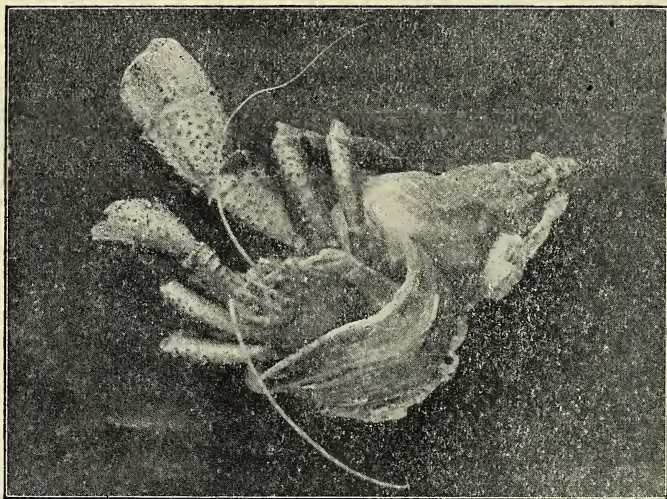
I mention this one, not because of its rarity but because of the curious gaps and differences in the records. Stevenson in his "British Fungi," 1886, describes it as common, as do all other text-books; so that it has been well enough known for some time. Yet, it does not appear in the B.A.H. 1901.

Between 1899 and 1915 it was recorded eight times in the T.B.M.S. at their annual forays. Between 1915 and 1938 there is one record only. In the T.C.S.S. it is recorded on three occasions between 1903 and 1920, five times between 1920 and 1928, but there are no subsequent records. These differences baffle explanation.

It was gathered at Braidwood on 17/9/1942, and at Kelburn, Largs, on 26/9/1944.

*Tricholoma carneum.*

There is no record for this in the B.A.H. 1901. In the T.C.S.S. it is recorded for Troon in 1928. It was gathered in Cadzow in September 1942, when it was growing in some profusion.



THE HERMIT CRAB,—Photo. J. G. Connell.



# LIST OF FIRST ARRIVALS OF SUMMER BIRDS IN CLYDE AREA IN 1945, COMPILED FROM REPORTS OF MEMBERS AND FRIENDS.

BY THOMAS ROBERTSON.

| Date      | Bird                       | Locality                                 | Average date over<br>35 years |
|-----------|----------------------------|--|-------------------------------|
| Mar. 7—   | Lesser Black - Backed Gull | Firhill Timber Basin, Glasgow (March 11) |                               |
| „ 8—      | „                          | Linn Park, Glasgow                       |                               |
| „ 10—     | „                          | Bothwell Bridge                          |                               |
| „ 18—     | Wheatear                   | Southend, Kintyre (Mar. 28)              |                               |
| „ 24—     | „                          | Garscadden, Glasgow                      |                               |
| „ 26—     | „                          | Carmichael, Lanarkshire                  |                               |
| „ 22—     | White Wagtail              | Summerston, Glasgow (Mar. 27)            |                               |
| April 14— | „                          | Largs                                    |                               |
| Mar. 27—  | Chiffchaff                 | Southend, Kintyre (April 8)              |                               |
| April 4—  | „                          | Bothwell Castle                          |                               |
| „ 5—      | „                          | Dalry                                    |                               |
| „ 6—      | Willow Wren                | Southend, Kintyre (April 12)             |                               |
| „ 11—     | „                          | Dumbarton                                |                               |
| „ 12—     | „                          | Largs                                    |                               |
| „ 12—     | „                          | Southend, Kintyre (April 9)              |                               |
| „ 6—      | Sand Martin                | Richmond Park, Glasgow                   |                               |
| „ 7—      | „                          | Dalry                                    |                               |
| „ 7—      | „                          | Largs                                    |                               |
| „ 7—      | „                          | Lochwinnoch                              |                               |
| „ 7—      | Swallow                    | Dalry (April 10)                         |                               |
| „ 8—      | „                          | Motherwell                               |                               |
| „ 8—      | „                          | Southend, Kintyre                        |                               |
| „ 9—      | Common Sandpiper           | Drymen (April 14)                        |                               |
| „ 13—     | „                          | Southend, Kintyre                        |                               |
| „ 14—     | „                          | Luggiebank                               |                               |
| „ 16—     | Sedge Warbler              | Southend, Kintyre (May 1)                |                               |
| „ 30—     | „                          | Summerston, Glasgow                      |                               |
| May 4—    | „                          | Darvel                                   |                               |
| April 18— | Redstart                   | Carmichael, Lanarkshire (April 27)       |                               |



|                                   |                                 |
|-----------------------------------|---------------------------------|
| April 18—Tree Pipit               | Carluke (April 23)              |
| „ 18— „                           | Largs                           |
| „ 24— „                           | Motherwell                      |
| „ 18—Cuckoo                       | Largs (April 23)                |
| „ 19— „                           | Kilmacolm                       |
| „ 19— „                           | Loganswell, Mearns              |
| „ 20— „                           | Dalry                           |
| „ 18—Common Whitethroat           | Carluke (May 3)                 |
| „ 22— „                           | Clydebank                       |
| „ 23— „                           | Dalry                           |
| „ 23— „                           | Motherwell                      |
| „ 18—Yellow Wagtail               | Motherwell (April 21)           |
| „ 21— „                           | Dalry                           |
| „ 23— „                           | Knightswood                     |
| „ 18—Whinchat                     | Largs (April 28)                |
| „ 24— „                           | Southend, Kintyre               |
| May 9— „                          | Motherwell                      |
| April 19—Corncrake                | Dalry (April 24)                |
| „ 24— „                           | Largs                           |
| May 2— „                          | Southend, Kintyre               |
| April 20—House Martin             | Largs (April 20)                |
| May 3— „                          | Busby                           |
| „ 5— „                            | Darvel                          |
| April 28—Swift                    | Shiskine, Arran (May 2)         |
| May 5— „                          | Dalry                           |
| „ 5— „                            | Lochwinnoch                     |
| April 30—Terns, Common and Arctic | Southend, Kintyre (May 8)       |
| May 9— „                          | Motherwell                      |
| „ 11— „                           | Largs                           |
| „ 5—Garden Warbler                | Lochwinnoch (May 10)            |
| „ 9— „                            | Motherwell                      |
| „ 9— „                            | Kilmacolm                       |
| „ 9—Spotted Flycatcher            | Richmond Park, Glasgow (May 12) |
| „ 12— „                           | Torrance                        |
| „ 15— „                           | Southend, Kintyre               |
| „ 12—Wood Wren                    | Portincross (May 1)             |
| „ 19—Grasshopper Warbler          | Clyde near Hamilton (May 7)     |
| „ 17—Blackcap                     | Bothwell Bridge                 |

## EXCERPTS FROM SOCIETY REPORTS

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### From the Council Report.

Miss Craig reported that 16 new members had joined the Society during the year. The membership now stands at 252. There are two Honorary and ten Life Members.

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### From the Hon. Treasurer's Report.

Mr. R. H. Johnstone stated that in April, 1945, a legacy of £10 was received from the Executors of the late Miss Jessie S. Henderson. He suggested that the issue of the monthly billets, calling the meetings of the Society, suspended during the war years, might be considered at an early date.

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### From the Hon. Librarian's Report.

The number of books issued during the past year was very moderate and was confined to a very few of the faithful.

It is interesting to note that our Library had a visit during the past winter from a member of the Mycological Department of the Royal Botanic Garden, the University of Edinburgh. He made the journey specially to refer to an American publication on our shelves, and expressed his great satisfaction to the City Librarian on obtaining the information he required.

The index is complete and can be seen at the far end of the floor on which our volumes are housed.

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### From the Editor's Report.

Dr. Patton reported that Part I. of Volume XV. had been issued to members in September 1945, and that he was at present engaged on Part II.

### **Report by Representative to the Scottish Marine Biological Association.**

Mr. Connell gave a very detailed account of the activities of the Station, dealing with the Government Grant; the Research on British Agar, on the Fertilisation of a Sea-Loch, on Oysters, on the Ecology of *Gigartina*, on Molluscan Ecology and on Anti-Fouling; Faunistic Records; and Educational Work. The number of visitors to the Museum and Aquarium for 1944-45 were:—Adults, 2657; children, 1969—total, 4626. These figures do not include people in uniform.

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### **Report by Representative to the West of Scotland Field Studies Council.**

Mr. J. Duncan Leslie stated that this recently formed Council had made an excellent beginning. An editorial committee is preparing material for a handbook introducing beginners and others to the Natural History and Archæology of the West of Scotland. A travelling exhibition of books dealing with animal and plant life (elementary) and with Archæology and Geology is being shown in certain Glasgow District Libraries. Another committee is seeking to form a Film Group for those interested in the production of Natural History films.

The Council has also compiled a panel of lecturers and outdoor guides with their subjects so that those organisations desiring a lecturer or leader may select therefrom.

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## **NOTES FROM EXCURSION REPORTS**

### **Society Excursions.**

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DUNURE, 2nd April, 1945—Conductor, *Mr. J. McCrindle*. A cold southerly wind was blowing when the party arrived; but the sun shone. Mr. McCrindle's rock garden was first visited and many interesting plants noted. The Canadian

Blood Root, *Sanguinaria canadensis*, was in flower, and *Ceterach officinarum*, Desv., from an Ayrshire locality, grew there.

A pair of ravens and their nest containing young were observed on the cliff face. Further along, the leader stated, another pair had also raised a brood. He also remarked that these birds when offered fresh meat bury it in the ground until it is covered with fungi, when they eat it.

Memories of John Smith were called up when the geologists of the party investigated the rock formations of the area. Jasper, Agate, Carnelian and pebbles from Ailsa were picked up.

The following plants were observed in leaf:—*Pimpinella Saxifraga*, Linn., *Crithmum maritimum*, Linn., *Daucus Carota*, Linn., *Ligusticum scoticum*, Linn., *Scilla verna*, Huds., and *Allium vineale*, Linn.

DUNDONALD, 7th April, 1945—Conductor, *Mr. J. Boyd*.  
On Saturday, 7th April, eight members turned up at Kilmarnock on an afternoon which gave more promise of sunshine than fulfilment.

Proceeding to Dundonald, the party first visited the old Castle of which legend says:

“ There is a castle in the west,  
They ca’ it Donald’s Din;  
There’s no’ a nail in it ava,  
Nor yet a timmer pin.”

Tradition has it that the original Donald who built the castle, coming to the Fairy Hill one day, lay down on the sward to sleep. In his dream, voices spoke of a treasure buried in the hillock. On awaking, he dug for the treasure, found it, and was thus able to build the castle. As the hill appears to be composed of hard, igneous rock, this digging must have been no mean feat.

It is believed that the present castle is not the original Din of Donald but was built upon the site of what was probably an ancient British fort.



After observing the high arched vault of the main hall, the party moved off to the wooded banks opposite the west side of the castle. There, a Tree-creeper (*Certhia familiaris*), with nesting material in its mouth, was observed making for a hole in a tree. Altogether, nineteen species of birds were observed on the excursion.

Here, also, several fallen trees provided interesting objects of study for the members. In the hollow trunk of one tree the mycologists found a large clump of *Coprinus radians*, which is strikingly characterised by the very large mass of tawny mycelium from which the stipes arise. This fungus, formerly called *Ozonium auricomus*, has not often been recorded locally. The only other fungi of note found during the excursion were *Polyporus trumalis* and what was probably *Peziza rapula*, although its condition made absolute diagnosis uncertain.

These rotting trunks provided admirable habitats for many mosses and liverworts, and the remarkable luxuriance of one of the latter, *Lophocolea cuspidata*, in fine fruiting condition, was a feature. *Nowellia curvifolia* was also observed. Of the mosses found the only species calling for special mention were *Homalia trichomanoides* and *Heterocladium heteropterum*. *Eurhynchium Stokesii* was also noticed, for, though a common moss, it occurred in most unusual abundance.

Of the flowering plants seen, the Alternate Leaved Golden Saxifrage, Whitlow Grass and the Wood Anemone were in bloom. The last-named had unusually pink flowers.

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COREHOUSE, LANARK, 5th May, 1945—Conducted by  
Mr. T. Robertson.

The attendance at this outing was seventeen. The weather was not good, but dull and cold with slight rain. The estate of Corehouse lies on the opposite bank of the Clyde from Lanark. The party entered by way of Kirkfieldbank. Bonnington Falls and Cora Linn were visited.

The find of the day for the Botanists was *Poa Chaixi*, Vill., by Mr. Prasher. Mr. Lee confirmed it. It had been recorded only once before for "Clyde" by Mr. Peter Ewing, when

the occurrence was considered accidental. At Corehouse this grass is abundant for some distance along the sides of the avenue, commencing near the entrance lodge. Among other plants observed mention may be made of Wood Stitchwort, *Stellaria nemorum*, Linn., Meadow Saxifrage, *Saxifraga granulata*, Linn., Guelder Rose, *Viburnum opulus*, Linn., Wayfaring Tree, *V. lanata*, Linn., *Zygodon viridissimus*, R.Br., and *Anomodon viticulosus*, H. & T.

Twenty-three species of birds were recorded, including the Grey Wagtail, *Motacilla c. cinerea*, Tunst., and the Dipper, *Cinclus cinclus gularis*, Lath.

THE FAIRIES' LAKE, Monday, 21st May, 1945—Conductor,  
*Mr. John R. Lee.*

In fine weather eight members visited the Fairies' Lake on the hill-side above Loch Lomond between Luss and Tarbet on this day, which was the annual "Victoria Day" holiday in Glasgow. The party travelled to Arrochar by train, thereafter walking the road along Loch Lomond-side southwards from Tarbet, and returning by the same route.

The Fairies' Lake, a tiny loch in surface area, but of very considerable depth, is situated in a picturesque hollow on the steep hill-side about four miles south of Tarbet, and at an altitude of about 600 feet above the level of Loch Lomond. It is reached by a steep pathway running parallel with the course of a small stream which descends from the lake itself. This pathway leads through a dense tangle of vegetation of the type characteristic of the "bonnie, bonnie banks"—scrub oak with birch and rowan and a thick undergrowth of bracken and the usual plants of the more open kind of highland woodland. The dell in which the little loch lies is a scene of striking beauty, in itself a full reward for the rather strenuous exertions needed for the climb from the road up to it. Hidden away in the recesses of the mountainside which here rises very steeply from the western shore of Loch Lomond, culminating in the peak of Beinn Bhreach (2233 feet), the little valley or pass (Bealach-nam-Chaoruinn—the pass of the rowan-trees)—extends only a few hundred yards northwards

behind a low ridge on its eastern side, with the dark mass of the mountain behind it on the west, all the slopes richly clothed with the dense woodland, the small loch itself lying peacefully in the shady recess thus formed, and adding the last touch of loveliness to the scene. The lake is a most remarkable one for the strange, and hitherto never fully or satisfactorily explained, colours which are displayed in its waters. Not only is there a quite unusual richness of reflection in its normally still and glassy surface from the greens and browns of the overshadowing vegetation, as well as an added fulness of colour from the abundant aquatic and semi-aquatic plant life in and around its margin, but in addition there is a very remarkable patch of a light blue colour in the centre of its widest part, apparently arising from some source at a great depth. This strange phenomenon, viewed from either shore, appears as though it were caused by something lying considerably nearer the farther side of the lake; but on the observer making his way round, he discovers that the same illusion of distance appears there also, seeming to suggest that the cause, whatever it may be, must be deep down near the centre.

Many attempts have been made to arrive at an explanation of the mysterious colours, and guesses—more or less scientific—have been hazarded; but none is regarded as fully explanatory. On this occasion the party listened with exemplary patience to a recital, by the conductor, of the well-known tradition of the beneficent fairies, who once upon a time carried on their good work here by employing their perhaps magical dyes for the benefit of the nearby humans, but after a tragic failure cast away in despair their colouring materials into the depths of the loch and fled away for ever. Being a company of scientific naturalists, this explanation was of course set aside as altogether unsatisfactory, but as no one was prepared to venture any more rational attempt, it was tacitly agreed to leave the mystery where it was.

Some time was spent examining the margins of the lake for the rich variety of plant life, particularly mosses and hepatics, with which the locality abounds; but nothing was



noted beyond what had been recorded on former visits. The most remarkable feature which was noted was the extreme abundance of a submerged form of the common hepatic *Aplozia cordifolia*, Dum., which is found forming great spongy masses of a dark green or almost black colour especially near the north-west corner of the lake.

Ascending to the top of the low ridge on the east already mentioned, the party enjoyed a brief rest on the hill-side from which a grand view of Loch Lomond can here be obtained. The prospect from this point is a particularly beautiful one. Exactly opposite, across the loch, a mile or so above the point at which it narrows below Rowardennan, the poetically famous "rocks o' Craigroyston" embowered in their dense green woods form the "steep, steep side o' Ben Lomond"; and away to the south-east stretches the broadening lower expanse of this grandest of Scotland's lochs, with its lovely islands—surely one of the fairest scenes even in this land of beauty.

Our appetite for natural scenery having been thus abundantly rewarded, and other forms of "appetite" calling for satisfaction, we now began to think of our journey back towards Tarbet—and tea. The descent from the Fairies' Lake can be made with rather less discomfort than is involved in the scramble downhill by the path we had used in our approach to it, for there is another but by no means so well-marked leading down towards Firkin Toll about a mile nearer Tarbet. This route, by which the return journey was made, leads one across some rather swampy moorland, sparsely studded with birch, and with the usual accompaniment of sphagnum, heather and bog-myrtle, through which we made our way without much difficulty. This done, a pleasant walk back to Tarbet Hotel, where a welcome repast was provided, rounded off an outing which must remain in our minds as a memorable day's enjoyment.

MILLPORT, 2nd June, 1945—Conductor, *Mr. Elmhirst, J.P.* The party, consisting of nine members, arrived at Millport at noon. The day was warm, a fresh east wind blowing.

At the Marine Station, Keppel Pier, the Director had a



number of interesting exhibits put out for the Society, viz. :—

1. Dr. A. P. Orr and Dr. S. M. Marshall—British Agar, the seaweed from which it is obtained, a short account of preparation and its use as a food-stuff.
2. R. Elmhirst, Director—The rate of growth of *Pecten maximus*, the Great Scallop, which is useful as a subsidiary fishing in the off season.
3. The team of Iron and Steel Institute workers at the Station—An exhibit of some stages in the sequence of fouling growths. Different types of fouling organisms grown on non-toxic surfaces. This exhibit illustrated some of the work on anti-fouling being carried out at the Station by the team engaged by the I.S.I. Anti-Fouling Subcommittee.

Later, the party enjoyed a walk along the shore and left the island at 7 p.m.

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ASHGROVE LOCH, 7th July, 1945—Conductor, *Mr. Prasher*. Ashgrove Loch, between Kilwinning and Stevenston, has been a favourite objective with members of the Botanical Section for many years, and visits by the Society have taken place on several occasions. Besides its richness in forms of marsh vegetation, however, the Loch is an attractive locality to the ornithologist and the entomologist. The late John Smith found it to be of interest to the archæologist also, reference having been made to traces of lake-dwellers in his "Pre-historic Man in Ayrshire."

This year, on Saturday, 7th July, a party of seventeen members paid a visit to this interesting locality in fine warm and sunny weather; and although nothing falls to be recorded which had not been noted on previous occasions, there was nevertheless a sufficient quantity of material in evidence to make the outing well worth while.

Mr. Robertson reports a list of 28 species of birds as having been noted during the afternoon. Of these the most notable included the following :—

Grasshopper Warbler—heard "reeling" strongly among the long grass and rushes, but was not seen.

Sedge Warbler.

Swift.

Sand Martin.

(These species were all noted at the loch—those following were observed on the road between the loch and Kilwinning.)

Swallow.

House Martin.

Corn Bunting.

(In a field near Kilwinning.)

Willow Warbler.

For the botanists the roadsides between Kilwinning and the loch itself furnished quite a number of interesting items, including the meadow crane's-bill (*Geranium pratense* L.), cow clover (*Trifolium medium* L.), black medick (*Medicago lupulina* L.), and viper's bugloss (*Echium vulgare* L.). Two plants of more than usual interest also seen here were the twayblade (*Listera ovata* Br.) and the crosswort (*Galium cruciatum* With.). This latter, common in most parts of our area, is curiously rare in this part of Ayrshire.

In the immediate vicinity of the loch itself a great variety of lacustrine and swamp forms was seen. One of the most striking features of the loch is the luxurious development of the bulrush (*Scirpus lacustris* L.), great beds of which occur, especially at the western end. Great quantities of the water-cress (*Nasturtium officinale* Br.) occur along the edge of the loch, and here also were noted many plants of the mare's-tail (*Hippuris vulgaris* L.), and also the rare water-hemlock (*Cicuta virosa* L.). On previous visits a species of bladder-wort (*Utricularia*) had been seen in some quantity, but on this occasion a careful search for this interesting plant proved unsuccessful.

There is a station near the roadside for the lesser water-parsnip (*Sium erectum* Huds.), and this was visited on the return journey to Kilwinning.

Excellent views of the surrounding country-side delighted the party on the return journey, and as the weather conditions were of the best, a beautiful prospect was enjoyed of the lower end of the Firth of Clyde, backed in the distance

by the Arran mountains and the prominent rock of Ailsa to the south-west.

A welcome tea in Kilwinning brought to an end a particularly enjoyable excursion, and the party returned by train to the city.

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TILLIETUDLEM, Lanarkshire, 1st September, 1945—

Conductor, *Mr. J. Duncan Leslie.*

The excursion duly took place under ideal weather conditions. There was a large turnout. Some time was spent in the vicinity of the Castle before the surrounding area was explored. As reports of previous excursions to this interesting area have appeared in earlier publications, details will be omitted.

The Wallflower, *Cheiranthus Cheiri*, Linn., Greater Celandine, *Chelidonium majus*, Linn., and *Sedum reflexum*, Linn., still grow on the Castle walls. In the grounds surrounding the Castle mention may be made of *Agrimonia Eupatoria* Linn., *Conium maculatum*, Linn., *Charophyllum temulentum*, Linn., *Origanum vulgare*, Linn., and *Calamintha Clinopodium*, Benth. On the way to Braidwood, Highland Cudweed, *Gnaphalium sylvaticum*, Linn., was observed.

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TINTO, 24th September, 1945—Conductor,

*Mr. R. H. Johnstone, M.A.*

An excursion to Tinto had been arranged for the Autumn Holiday of 1939, but the outbreak of war caused its abandonment. However, on 24th September, this year, a small party enjoyed the climb under favourable weather conditions—a bright sun and a strong north-west wind. The wind was rather too piercing for comfort on the summit. The climbers' hopes of a good view were realised; but unfortunately the indicator was no longer in existence.

The journey from Glasgow to Tinto is made across ground overlying the various strata of the Carboniferous System, until, in the vicinity of Thankerton, the Old Red Sandstone is reached. Here, an intrusive mass of felsite "has been

injected into the Downtonian and Lower Old Red Sandstone sediments"; here stands Tinto (2335 feet), rising over 1600 feet above the Clyde. The Tinto Hills stand just to the north of the Southern Boundary Fault, which brings the Old Red Sandstone down against the Silurian of the Culter Hills.

The party saw many evidences of glaciation from the time that the train traversed the Kames of Carstairs until the rounded summits of the Southern Uplands were viewed from the top of Tinto.

Among the plants noticed were:—*Alchemilla arvensis*, Sm., Field Lady's Mantle; *Silene inflata*, Sm., Bladder Campion; *Senecio viscosus*, Linn., Stinking Groundsel; and *Stachys sylvatica* x *palustris*, the Hybrid Woundwort. The Cowberry, *Vaccinium Vitis-Idæa*, Linn., was in fruit and plentiful.

In a plantation at the foot of Tinto a specimen of *Boletus luteus* was gathered which, while not rare, is not so often seen as to be unworthy of comment.

## REPORTS FROM THE SECTIONS

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### Botanical Section.

Weather conditions during the past year have been rather erratic, unusually warm and sunny periods prevailing during the spring and early summer, followed by cold winds and heavy rains in the normal "summer" period, and ending up with dry, warm and summer-like sunshine in the late autumn. Nevertheless the sectional outings arranged by the Botanical Committee were for the most part carried out under fair conditions, only on two occasions being attended with heavy rain. The numbers taking part in these outings indicated that members found the Section's programme both interesting and enjoyable.

Thirteen such sectional excursions were arranged for, and all were carried through on the specified dates, although one of them had to be altered on account of transport difficulties. The average attendance of members at these outings was 11; the highest number being 18, and the lowest 3. This lowest figure may, however, be accounted for by the fact that this



was at one of the excursions when unfavourable weather prevailed. This outing was to Torrance Glen, near East Kilbride, on 14th April, on which date exceptionally heavy rains broke into a period of fine weather. The three who braved the storm were, however, rewarded by finding many of the common plants of early summer already in fine bloom, the most interesting of which was the alternate-leaved golden saxifrage (*Chrysosplenium alternifolium*, L.).

The season opened, however, a fortnight earlier, with a very enjoyable excursion to Glen Killoch, beyond Barrhead, on 24th March. The afternoon was very warm and sunny; and notwithstanding the early date 16 species of plants were noted in flower. A feature of the outing was the early appearance of the leaves of many trees, especially sycamore and horse-chestnut. An occurrence in considerable abundance was noted of the small creeping willow-herb from New Zealand (*Epilobium nummularifolium*, R. Cunn.), which has within the past ten years or so become a feature of our local flora.

A visit to Eaglesham on 21st April, for the moors and an ascent of Ballageich, attracted our maximum attendance. The day was ideal—a bright, sunny afternoon with a strong north-west wind. Two plants of special interest were noted at Eaglesham—the master-wort (*Peucedanum Obstruthium*, Koch) and the dusky cranesbill (*Geranium phaeum*, L.). Both were in considerable quantity. On the moors much time was spent noting the specially early appearance of many moorland flowers, including *Viola palustris*, L., *V. lutea*, Huds., and *Vaccinium Myrtillus*, L. In muddy pools among the heather *Ranunculus Lenormandi*, Schultz, was found in fine bloom; while floating in clearer parts of the water large tufts of a species of *Draparnaldia* were collected.

A week later (28th April) fourteen members travelled to Bridge of Weir for a walk via Killallan to Kilmacolm. Although the day was cold, there was bright sunshine most of the time; and an enjoyable outing resulted in the party being able to note special features of the localities passed through. Only one of these results, however, constituted an

addition to previous records. This was the finding of a plant of the wall lettuce (*Lactuca muralis*, Fresen.)—a new station for this rare plant. Other plants noted during this afternoon included *Sisymbrium Thalianum*, Hook., *Lepidium Smithii*, Hook., and *Claytonia sibirica*, L., and a shrub of the scarlet-fruited elder (*Sambucus racemosa*, L.) attracted attention.

The excursions during May—one to Skelmorlie Glen (12th) and one to Prestwick (26th)—were favoured with dry, warm conditions. At Skelmorlie over seventy species of flowering plants were noted in bloom, including the early purple orchis (*Orchis mascula*, L.) and the melic-grass (*Melica uniflora*, Retz.). Two species of speedwell (*Veronica Chamædrys*, L., and *V. montana*, L.) were noted. The well-known occurrence of *Petasites fragrans*, Presl., was observed, the plant being of course long past flowering.

The outing to Prestwick, although yielding many of the well-known species occurring on the sand-dunes in that favoured locality, was in some respects a disappointment. The operations of the military and air forces during the war, in the area between Prestwick and Troon, have resulted in a sad deterioration in the botanical interest of this—one of the most attractive parts of our Clyde coast. In particular, the dunes near Prestwick, where hitherto we have been able to find a number of the plants of uncommon interest, have been practically destroyed by the dumping of rubbish; and much of the wild flora, here so well represented, will be seen no more. Some of the species, however, were still to be found, amongst them a considerable abundance of the burnet-leaved rose (*Rosa spinosissima*, L.). Other plants noted were *Ranunculus bulbosus*, L., *Viola canina*, L., *Cerastium tetrandrum*, Curtis, *C. semidecandrum*, L., *Erodium cicutarium*, L'Hérit, and *Saxifraga granulata*, L.

An outing on 9th June was intended to be a visit to Loch Lomond, with Luss as the objective. The expected steamer facilities, however, not being available, the members substituted a walk from Balloch to Cardarvon Loch; and in spite of this partial disappointment a very successful afternoon

was spent. Although on the whole June was a poor month for weather, on this particular day it was dry and cool. The marshy ground beside the loch yielded many plants of interest, including both the white and yellow water-lilies, and a number of the common sedges and grasses. Upwards of ninety species were noted in flower.

A week later—on 16th June—there was an attendance of four members at an outing to Dumbarton. The interesting ground near the railway station, and especially that around the foot of the historic Rock, rewarded the faithful few with one of the most interesting outings of the season. Two species of mallow (*Malva sylvestris*, L., and *M. moschata*, L.) were seen, and the occurrence of the Alexanders (*Smyrniolum Olusatrum*, L.) was observed. On this occasion the weather was again kind, the afternoon turning out warm and sunny.

Very different conditions threatened on the next Saturday afternoon (23rd), when the Section had made plans for a visit to the Whangie. Rain began to fall just as the party were assembling at the bus station, resulting in the defection of a number who had intended going. Nevertheless, seven members decided to brave the elements. These intrepid ones might well have been daunted a little later on when, as the bus in which they travelled was making its way northwards along the Stockiemoor road, a cloudburst of exceptional violence swept over the country. On arrival at Auchineden rain was still falling, and the party took shelter below the trees near the entrance to the estate. However, after a short while, the weather having abated somewhat, a start was made across the moor; and for the rest of the afternoon conditions were fairly good, although the wonderful landscape view for which the hillside beyond Auchineden is justly famous was in this instance obscured by heavy mist. Although no botanical feature of particular importance falls to be recorded, this was an outing of great general interest, especially to some of the party who had not previously experienced the impressive wonders of the Whangie.

The members who braved the elements on this occasion were more fortunate than the party who, a week later, carried



through the outing arranged to Beith Mill on 30th June. Our Society has had many experiences of the variety of which the climate of Scotland is capable; but not for many years have we been subjected to such conditions as prevailed on this afternoon. Rain commenced to fall on our arrival at the point where it had been arranged to leave the bus near Beith Mill, and it rapidly got worse as the day wore on. For a distance of three or four miles—over most interesting ground—by which we made our way into Beith, the rain fell with torrential violence, and it was a group of thoroughly drenched travellers which waited somewhat dejectedly for the return bus from there to the city. All were agreed, however, that the stretch of country which had been passed through would well repay another visit under more favourable conditions, and were mutually resolved to try again on some future occasion. A long list of plants noted showed the locality to be of considerable botanical interest, these including *Scabiosa arvensis*, L., a species rare in the Clyde area.

The traditions of the Society were upheld by a visit to Possil Marsh on 28th July, an attendance of 14 members testifying to the perennial interest attached to this well-known haunt. Of the familiar plants characteristic of the marsh, it was noted that while the tall reed-grass (*Glyceria aquatica*, Sm.) seems to be on the increase, both the true reed (*Phragmites communis*, Trin.) and the bulrush (*Scirpus lacustris*, L.) are dwindling. The mare's tail (*Hippuris vulgaris*, L.) is another plant, formerly abundant, which is now much reduced in numbers. *Sium erectum*, Huds., continues to spread; and the beautiful *Stellaria glauca*, With., appeared to be recovering somewhat. Among the willows examined was a number of apparently hybrid forms.

Two excursions during August completed the sectional programme. The first was on 11th August, when a visit was paid to the sand-pits at Tollcross, the walk being extended to include Kenmuir Bank and Carmyle woods. The most interesting plants of the Tollcross sands noted were *Sisymbrium altissimum*, L., *Melilotus alba*, Desr., *Ornithopus perpusillus*, L., *Erythraea Centaurium*, Pers., *Convolvulus arvensis*, L., and *Juncus glaucus*, Ehrh.



The final outing of the Section for the season was a visit to the site of the projected Glasgow Zoo at Calderpark, near Broomhouse. Much interest was taken in the ground which it is proposed to utilise in setting up what should prove a valuable addition to local facilities for the study of natural history; and from our point of view the outing was successful in furnishing one of the few rarities which we have been able to record this year. This was a plant of the red goosefoot (*Chenopodium rubrum*, L.), a species seldom found in our area. *Melilotus altissima*, Trin., was also found, and in the woods the graceful millet-grass (*Milium effusum*, L.) was noted.

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### Ornithological Section.

The season was remarkable for the uniformly early records for almost all summer migrants.

The remains of a Song Thrush found at Dalry on 27th April, 1945, bore a ring which had been put on the bird when it was trapped near Blackpool, Lancashire, in January 1945.

There were two periods during 1945 of approximately a fortnight each when the weather was hard on bird life. The first was in the latter half of January, when the severe frost killed numbers of birds, especially Redwings and other members of the Thrush family. The second period covered the last week of April and the first week of May. Then many species of resident birds were nesting, with the result that there were reports of deserted nests, addled eggs or dead nestlings. Otherwise the weather of 1945 was remarkably good, and the early appearance of migrants from the north was not followed by a severe or early winter.

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### Entomological Section.

#### *Lepidoptera.*

The year 1945 was noteworthy for the large number of Red Admiral Butterflies, *Vanessa atalanta*, Linn., reported within our area by members of the Society and in the news-

paper correspondence. Some considerable comment has also been made about the late dates at which this species was seen. Mr. William Russell informs me that this was entirely due to the weather, which also gave us late Brambles.

The Peacock Butterfly, *Vanessa io*, Linn., was also much in evidence; reports of its appearance coming in from the middle of June onward.

Mr. D. M. Lothian reported the appearance of the Painted Lady Butterfly, *Vanessa cardui*, Linn., in the Cambuslang area, where its presence has not been noted for some years.

Mr. William Russell reports the capture of a specimen of the Poplar Hawk Moth, *Smerinthus populi*, Linn., on July 4th, at Tantallon Road, Langside. Further reports by Mr. Graham and others would seem to indicate that this species was fairly common this year.

Mr. Russell also reports the capture of a specimen of the Peppered Moth, *Amphidasya betularius*, Linn., var. *Double-dayaria*, Mill., at Langside on the 9th of July. This is a good record, as, according to the Lepidoptera list in the Clyde Area Catalogue, our only record of this variety, at that date was bred from larvæ, near Paisley, by the late Mr. J. Dunsmore.

### *Coleoptera.*

We seldom hear of any species of Coleoptera turning up in very large numbers over a wide area, as happens not infrequently in some of the other Orders. We do, however, have years in which some particular species will show a marked increase within a restricted area. This would seem to have happened in the case of the Devil's Coach Horse, *Ocypus olens*, Linn., in the Maryhill district of the city. In the late summer, within that part of Maryhill bounded by Maryhill Road, Gairbraid Avenue and Collina Street, I came across dozens of specimens, dead and alive. Over a period of several weeks I seldom passed through this very small area without coming across several specimens. Mr. William Rennie informs me that he saw several on the road and pavements between Queen's Cross and Ruchill Park, also in the Maryhill district; an unusual occurrence in his experience. This is at the other end of Maryhill and some distance from where

I found them to be so numerous. This species is not uncommon in gardens and elsewhere, but I have never found it in such numbers before, anywhere.

*Amara ovata*, Fab. This Ground Beetle has been recorded from Ayr, Dumbarton and Main Argyll. I have a specimen taken near Carmunnock in June, which adds Lanarkshire to our notes on its regional distribution.

*Trigonogenius globulus*, Solier., I found (one specimen) on a stair in Kelvinside Avenue, Glasgow, on 23rd March. We have only one other record of this species in our area, Coatbridge, by Mr. McLeod. This species is closely related to the much more familiar, *Niptus hololeucus*, which is commonly found in city houses.

My friend, Dr. J. S. Sharpe, of Stafford, informs me that he captured a specimen of the Longicorn Beetle, *Asemum striatum*, Linn., on 24th May. It was on a recently cut Fir stump at Craigend, near Milngavie. This is a very good record, as very few specimens of this Longicorn have been taken within our area.

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### Geological Section.

The summer excursions were very popular last year and were exceptionally well attended. In particular, the excursion conducted by Mr. William McLean to Airdrie Museum, followed by the inspection of a local peat moss, suspected of being the remnant of a glacial loch, was most interesting.

Exposures of coal which had been baked by basalt intrusions, and the finding of fossils, particularly fish teeth, in the limestone at Jenny's Well, made the excursion led by Mr. Stollery to Hawkhead both interesting and instructive.

Informal meetings were held during the session, at which papers were read. At one of these the "Roman Wall," introduced by Mr. Kirkwood, was discussed. The members present evinced considerable knowledge of this subject, and the meeting was memorable for the wealth of information submitted. Particular mention should be made of the old newspaper cuttings and photographs tabled by Mr. William Rennie.

Session XV.—1945.

**DIGEST OF THE PROCEEDINGS OF THE SOCIETY.***President*—J. DUNCAN LESLIE.*Vice-Presidents*

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## SOCIETY MEETINGS.

9TH JANUARY, 1945.

Mr. J. Duncan Leslie, president, occupied the chair at the first meeting of the Fifteenth Session.

The following new members were admitted to the Society:—Miss E. Doris Bertram, B.Sc., 13 Newlands Road, S.3., and Miss Lilian G. Shearer, B.Sc., 37 Kilmarnock Road, Giffnock.

The evening was devoted to the annual exhibition given by the Photographic Section. Mr. Thomas Robertson showed a large number of slides, in colour, of bird life studies. An extensive series, also in colour, kindly lent by Mr. McCallum, of the Glasgow and West of Scotland Photographical Association, revealed the beauties of West Highland scenery. Mr. McCallum's exhibit also included some illustrations of village scenes on the East Coast of Scotland.

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13TH FEBRUARY, 1945.

The Annual Business Meeting of the Society took place, Mr. J. Duncan Leslie presiding.

The following new members were admitted:—Miss Isa Anderson, 56 Maryland Gardens, S.W.2.; Mr. Hugh Cross, 61 Sinclair Drive, Langside, S.2.; Mr. Thomas Galloway, 29 Morningside Street, E.1; and Mr. James Y. Hart, 33 Kelvingrove Street, C.3.

The reports of the Society's activities were read and approved. The following new office-bearers were elected:—*Vice-President*, Mr. John G. Connell, F.R.M.S.; *Secretary*, Miss Jean C. D. Craig, B.Sc., A.R.I.C.; *Members of Council*—Miss Mary E. T. McKinna, Mr. James Anderson and Mr. John Boyd.

Miss A. A. Meikle, B.Sc., N.D.A., took over the convener-ship of the Zoological Section rendered vacant by the departure to England of Professor L. A. L. King.

An appreciation was minuted of the valuable work done by Mr. James Anderson, who, for fourteen years, had held the office of Hon. Secretary.

13TH MARCH, 1945.

Mr. J. Duncan Leslie, President, in the chair.

On this occasion the Society met to discuss "The Preservation of Natural History Sites in the Clyde Area." Dr. J. Inglis Cameron read an introductory report of the possibilities arising from Regional Planning in the Clyde Drainage Area. The hope was expressed that there would be open tracts of country which would be left in their natural state in order to preserve the flora and fauna peculiar to them. Reports were submitted on such areas by Mr. John R. Lee, Mr. T. H. M. Gordon and Mr. Thomas Robertson. Mr. Grieve, of the Town and County Planning Advisory Committee, who was present, advised that a comprehensive report on the most valuable sites for field studies be submitted to his committee.

A motion by Mr. Lee, that Dr. Cameron be asked to prepare such a report, embodying the three reports submitted to the meeting, was carried, and Dr. Cameron kindly consented; copies of the report to be submitted to the members. (v. p. 37.)

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16TH APRIL, 1945.

Mr. J. Duncan Leslie, President, in the chair.

Reference was made by the President to the loss which the Society had sustained by the death of Mr. H. R. J. Conacher, Bridge of Weir, and the Secretary was instructed to write to Mrs. Conacher expressing the sympathy of the Society.

Dr. Inglis Cameron's report relative to the preservation of Natural History sites in the West of Scotland was submitted to the meeting. An additional report, from the geologist's point of view, prepared by Mr. W. J. Cannon, was incorporated in it.

Mr. John R. Lee gave a very instructive lecture on "Some Less Familiar Plants." He stressed the need for careful observation and attention to detail on the part of the beginner, especially when dealing with plants which have a superficial resemblance and a similar popular name but no morphological relationship. Mr. Lee elaborated his theme

by discussing in detail several pairs of plants which might lead to confusion. These included (a) the Wood Violet, *Viola sylvatica* and the Dog Violet, *V. canina*, (b) the Water Bedstraw, *Galium palustre* and Marsh Bedstraw, *G. uliginosum*, (c) Samphire, *Crithmum maritimum* and Marsh Samphire or Glasswort, *Salicornia herbacea*, (d) the Lesser Celandine, *Ranunculus Ficaria* and the Greater Celandine, *Chelidonium majus*, (e) Devil's Bit Scabious, *Scabiosa succisa* and the Sheep's Scabious, *Jasione montana*, (f) Thyme-leaved Flax, *Radiola milligrana* and Purging Flax, *Linum catharticum*, (g) Wall Lettuce, *Lactuca muralis* and Common Nipplewort, *Lapsana communis*, (h) the Lesser Skullcap, *Scutellaria minor* and the Common Skullcap, *S. galericulata*. Beautiful herbarium specimens of the plants under discussion were exhibited. The lecturer also showed some excellent drawings to illustrate the variety of the pappus formation in the fruit of several members of the Compositæ, including Dandelion, Groundsel, Goat's Beard, Cat's Ear and Autumn Hawkbit.

A discussion followed in which Professor Walton gave some interesting information about *Crithmum maritimum*, and Dr. Patton commented on the nature and origin of certain popular plant names. Mr. Lee was warmly thanked for his lecture.

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14TH MAY, 1945.

Mr. J. Duncan Leslie, President, in the chair.

Mr. T. H. B. Whiteford, 24 Verona Avenue, Scotstoun, W.4, was admitted a member of the Society.

Two Sectional conveners gave very interesting accounts of their experiences whilst pursuing the study of the Natural Sciences, and much valuable advice was imparted.

Mr. W. J. Cannon dealt chiefly with Geology, Mr. T. H. M. Gordon with Entomology.

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11TH JUNE, 1945.

Mr. J. Duncan Leslie, President, in the chair.

The following new members were admitted:—Miss Wini-

fred U. Flower, B.Sc., The Training College, Jordanhill, W.3.; Miss Elizabeth R. Brock, M.A., Spittal Cottage, 15 Victoria Place, Dumbarton; and Mr. Archd. R. Lindsay, B.Sc., A.R.C.S., 23 Dorian Drive, Clarkston, Glasgow.

Mr. Thomas Robertson submitted a list of the first arrivals of British birds in the Clyde Area in 1945, compiled from reports from members and friends. (v. page 63.)

The annual exhibition of the results of the activities of the various sections of the Society followed. The Botanical Section had on view flowers, common and not so common, collected by Mrs. Glen, Miss Scott, Miss Craig, Miss McKinna, Mr. Boyd, Mr. Shanks and Mr. Prasher. The Geological and Microscopical Sections displayed a fine collection of rocks and minerals, many beautifully polished by Mr. Osborne. A Death's Head Hawk Moth was on view.

Mr. Rennie contributed a note regarding 110 samples of Sphagnum taken at random from sacks, from localities unknown, which had been sent to the Botany Department of Glasgow University for Red Cross purposes. The samples had been identified by Mr. John R. Lee, with the following results:—

The specimens represented five groups, viz.:—*Acutifolia*, 41 specimens; *Cuspidata*, 18; *Cymbifolia*, 48; *Squarrosus*, 2; *Sub-secunda*, 1.

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9TH OCTOBER, 1945.

Mr. J. Duncan Leslie, President, in the chair.

The following new members were admitted:—Mrs. C. H. Duke, M.A., M.B., Ch.B., D.P.H., 45 Munro Road, W.3; Mr. James Seaton, 148 Berwick Drive, Cardonald, S.W.2.; and Professor A. M. Yonge, Ph.D., D.Sc., F.R.S., Department of Zoology, the University, Glasgow.

Professor Yonge delivered a most interesting and instructive lecture on "Coral Reefs of Florida," which was illustrated by lantern slides.



13TH NOVEMBER, 1945.

The chair was taken by Mr. John G. Connell, F.R.M.S., Vice-President.

Mr. Robert H. Johnstone, M.A., communicated a paper on "Some Clydesdale Records of Fungi" (v. page 59); and Mr. S. McClelland, M.A., one on "Bird Watching in a Town Garden."

With the aid of a series of interesting illustrations, Mr. McClelland described in great detail the observations he was able to make from hides constructed in his garden. At the outset he described the internecine conflict that goes on in Nature—a chapter of accidents. He gave a graphic account of the jealousies of the robins and of the behaviour of these birds during the nesting season. Observations were also made upon the nesting of the Hedge Sparrow, Thrush, Blackbird, Greenfinch, Willow Warbler, and the Spotted Flycatcher. The lecturer described minutely the urge of the parent birds to feed the chicks, and the urge to nest-cleanliness with special reference to the Greenfinch and the Willow Warbler. He asked the question, "If the fact that there is some 'influence' emanating from the nest is accepted, is it possible to say definitely whether nest-sanitation is the result of a desire to keep the nest clean or the chicks clean?" The conclusion he came to was, "that the chicks and not the nest provide all the necessary stimulus." . . . Further, "It was noticeable that, of all the garden nesting birds, the Greenfinch had by far the filthiest nest. Why should this be so, especially when its near relative, the Chaffinch, keeps such a neat and spotless home? . . . The clue is, I think, found in the different manner of feeding. The Greenfinch, unlike the others, fed by regurgitation and, from observation, this method does not involve so many visits to the nest, which in turn means that the stimulus to cleanliness is not nearly so often in operation."

Reports of excursions to Dunure on 2nd April, to Donald on 7th April, and to Rowallan on 4th August were read by Mr. John Boyd. Mr. John R. Lee reported on the excursion to the Fairies' Lake, 21st May; and Mr. Prasher dealt with the Millport excursion, 2nd June, and with the excursion to Ashgrove Loch, 7th July.

Comment was made upon the large number of Red Admiral Butterflies (*Vanessa atalanta*) seen in the Glasgow area during the late summer. Mr. Nicol Hopkins reported having counted over 200 in Richmond Park.

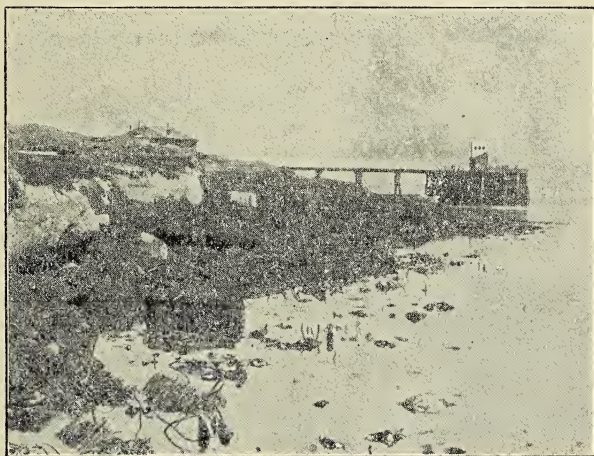
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11TH DECEMBER, 1945.

Mr. J. Duncan Leslie, President, in the chair.

The following new members were admitted:—Miss Jean G. Macrae, M.A., 170 Airbles Road, Motherwell; Mr. A. Forrest, 1389 Pollokshaws Road, S.I.; and Mr. David M. Lothian, Bockhill Cottage, East Hallside, Cambuslang.

The Goodfellow Lecture was delivered by Dr. Elsie Conway, of the Department of Botany, Glasgow University, who took as her subject "Heredity." The lecture was intensely interesting. Technicalities were explained so as to be understood by all present, and the subject was aptly illustrated by lantern slides, diagrams and cultures.



KEPPEL PIER, MILLPORT.—Photo. J. G. Connell.

## LIST OF MEMBERS

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\*=*Glas. Nat. Hist. Soc.*; †=*And. Nat. Soc.*; ‡=*Micro. Soc.*

### Honorary Members

- \*1885—BOWER, FREDERICK ORPEN, Sc.D., LL.D., F.R.S.  
(Professor emeritus), 2 The Crescent, Ripon,  
Yorks.
- \*1902—GRAHAM KERR, Sir JOHN, M.A., LL.D., F.R.S.  
(Professor emeritus), Dalny Veed, Barley, Royston,  
Herts.

### Life Members

- \*1920—EWING, RAYMOND, 6 Glenan Gardens, Helens-  
burgh.
- \*1920—GARDINER, WILLIAM GUTHRIE, Moraig, Stirling.
- \*1911—GILMOUR, COLIN C. B., M.A., M.B., Ch.B., Tigh  
an Ellen, Islay.
- \*1910—JACK, Prof. JAMES ROBERTSON, M.I.N.A.,  
Massachussetts Institute of Technology, Cam-  
bridge, Mass., U.S.A. President, *And. Nat. Soc.*,  
1913 and 1914. Joined *And. Nat. Soc.*, 1902.
- \*1879—LIGAT, DAVID, Northbank Factory, Newmilns.
- \*1899—LINDSAY, JOHN, M.A., M.D., 15 Dunearn Street,  
C.4.
- \*1921—McCUTCHEON, JAMES, F.S.Sc., 30 Vancouver  
Street.
- \*1904—WORDIE, WILLIAM, 52 Cleveden Drive.

### Ordinary Members

- 1938—AIRD, ROBERT, M.A., M.B., Ch.B.(Aberdeen),  
D.T.M. & H.(Eng.), 203 Southbrae Drive, W.3.
- 1933—AITKEN, HUGH H., M.A., Gallowflat School,  
Rutherglen.
- 1945—ANDERSON, Miss ISA T., 56 Maryland Gardens,  
S.W.2.
- \*1922—ANDERSON, JAMES, 22 Braehead Avenue, Miln-  
gavie. Hon. Secretary, 1931-1944; Mem. Coun-  
cil; Mem. Phot. Section; Convener Micro. Section;  
Mem. Publ. Committee; Joined *Micro. Society*,  
1922; Hon. Secy. *Micro. Soc.*, 1924-30.
- 1944—ARNEEL, JOHN, 408 Allison Street, S.2.
- 1940—BAIN, Miss JESSIE G., 2 Kirklee Quadrant, W.2.

- 1942—BALFOUR-BROWNE, Prof. F., M.A., F.R.S.E.,  
Brocklehurst, Collin, Dumfries.
- \*1908—BALLANTINE, A., 101 Buchanan Street, C.1.
- †1910—BARR, Rev. ROBERT, J.P., T.D., M.A., The Manse,  
Neilston.
- \*1906—BARTHOLOMEW, JAMES, Glenorchard, Torrance,  
near Glasgow. Mem. Orni. and Zoo. Sections.
- 1944—BENNETT, JOHN, 92 Menock Road, S.4.
- 1944—BERRY, JOHN, M.A.(Cantab.), Ph.D.(St. And.),  
F.R.S.E., Tayfield, Newport, Fife.
- 1945—BERTRAM, Miss E. DORIS, B.Sc., 13 Newlands  
Road, S.3.
- 1946—BIGGAR, JOHN, 3 Westclyffe Street, S.1.
- 1944—BISSETT, Miss ALICE MARGARET, M.A., 35  
Beechwood Drive, W.1.
- 1936—BLACK, Miss MARY M., M.A., 15 Onslow Drive, E.1.
- 1934—BOWIE, Miss D. C., 2 Glenburn Place, Kilmacolm.
- 1943—BOYD, JOHN, Nelson House, Largs. Mem. Council,  
Bot. and Ento. Sections.
- 1938—BOYES, JOHN, B.Sc., Morven, Eaglesham.
- †1928—BRAID, Prof. KENNETH W., M.A., B.Sc., B.Sc.  
(Agric.), 22 Buchanan Street, Milngavie.
- 1945—BROCK, Miss ELIZABETH, M.A., 15 Victoria  
Street, Dumbarton.
- 1932—BROWN, J. I., 45 Baldwin Avenue, W.3.
- †1896—BROWN, ROBERT, 12 Stirling Avenue, Westerton.  
Former Hon. Treasurer, *And. Nat. Soc.*
- †1926—BUCHANAN, DAVID, 7 Hillfoot Avenue, Rutherglen.  
Mem. Micro. Section.
- 1941—BURMAN, ARTHUR, 41 Trinley Road, W.3.
- 1941—BURMAN, HARRY, A.I.C., A.M.I.Chem.E., 82 Dee  
Street, E.
- 1942—CAMERON, Mrs. ELLA B., 273 Knightswood Road,  
W.3.
- 1942—CAMERON, J. INGLIS, M.B., Ch.B., F.R.F.P.S.  
(Glas.), 273 Knightswood Road, W.3. Mem.  
Council; Rep. to *West of Scotland Field Studies  
Council*.
- 1931—CAMPBELL, ALEXANDER F., M.A., 16 Newkirk  
Square, Bearsden.
- 1933—CAMPBELL, ROBERT, 4 Great Western Terrace,  
W.2. Mem. Bot. Section.
- 1943—CAMPBELL, RODERICK S. F., 32 Easteraigs,  
Glasgow, E.1.
- 1932—CAMPBELL, W. C., 440 Knightsbridge Drive,  
Bankhead, Rutherglen.



- 1938—CANNON, WILLIAM JOHN, F.G.S., 17 Bassett Crescent, W.3. Convener Geol. Section; Mem. Phot. and Micro. Sections.
- 1919—CARMICHAEL, Mrs. CHRIS. P., 119 Montrose Street, C.4.
- †1928—CARRIE, W. W., 12 Netherview Road, S.4.
- 1935—CHAPMAN, Miss JESSIE, c/o McAllister, 6 Loch Fyne Terrace, Ardrishaig, Argyll.
- 1940—CHRISTIE, WILLIAM, 26 Blythswood Road, Renfrew.
- 1931—CLIMIE, Miss ALLINA J., B.Sc., 32 Tassie Street, S.1.
- 1931—COCHRAN, KENNETH, M.A., B.Sc., 198 Hamilton Road, Mount Vernon, E.2.
- 1944—COLVIN, T. S., 895 Cumbernauld Road, E.1.
- \*1908—CONNELL, JOHN G., F.R.M.S., 129 Broomhill Drive, W.1. Vice-President; Mem. Zoo. Section; Rep. to *Committee of the Scottish Marine Biological Association* 1908-1945; President, *And. Nat. Soc.* 1915 and 1916.
- 1944—CORNWALL, IAN, 13 Kelvin Drive, N.W.
- 1943—COZENS, KENNETH, 58 South Mains Road, Milngavie.
- 1935—CRAIG, Miss JEAN C. D., B.Sc., A.R.I.C., 39 Westbourne Gardens, W.2. Hon. Secretary from 1945; Mem. Micro. and Geol. Sections.
- 1940—CRAWFORD, JOHN S., 10 Ashgrove Street, Ayr.
- 1940—CROMWELL, B. T., B.Sc., Ph.D., Agricultural College, Auchincruive, Ayrshire.
- 1932—CURRIE, Miss BETSY, Abercorn School, Paisley. Mem. Zoo. Section.
- †1916—DALLAS, WILLIAM, F.R.I.C., A.M.I.Chem.E., 944 Sauchiehall Street, C.3.
- \*1907—DAVIDSON, W. CAMERON, M.B., Ch.B., Avonleigh, Arcadia Road, Torquay.
- †1886—DEWAR, DONALD, 23 Doune Terrace, N.W., Auditor.
- 1931—DICK, A. F., 5 Hillfoot Terrace, Bearsden.
- 1943—DICKSON, D. STANLEY, LL.B., 137 St. Vincent Street, C.2.
- †1910—DOYLE, GEORGE, 791 Dumbarton Road, W.1.
- 1943—DREWELL, CHARLES H., 78 Fergus Drive, N.W.
- 1945—DUKE, (Mrs.) C., M.A., M.B., Ch.B., D.P.H., 45 Munro Road, W.3.
- 1938—DUNLOP, JAMES, M.A., M.B., Ch.B., 60 Culrain Street, E.2.

- 1943—DUNNACHIE, Miss A. DENISE H., M.A., 1773 Shettleston Road, E.2.
- \*1909—ELMHIRST, RICHARD, J.P., Marine Station, Keppel Pier, Millport, Isle of Cumbrae. Mem. Zoo. Section.
- 1937—EMERY, GEORGE A., Cowglen Golf Club, Barrhead Road, Pollokshaws.
- †1885—EWING, Mrs. ELIZABETH (Mrs. PETER), 6 Glenan Gardens, Helensburgh. Joined *Glas. Nat. Hist. Soc.*, 1895. President *Glas. Nat. Hist. Soc.*, 1919-1920.
- †1895—FERGUSON, THOMAS, F.E.I.S., 47 Arthurlie Street, Barrhead.
- \*1896—FERGUSON, ANDERSON, F.E.S., 24 St. Margaret Street, Dunfermline. Mem. Ento. Section; Mem. Publ. Committee. President, *Glas. Nat. Hist. Soc.*, 1929-1930.
- \*1929—FERGUSON, ANDREW G., 24 St. Margaret Street, Dunfermline.
- 1942—FERNIE, MURRAY, 16 Dudley Drive, W.2.
- 1941—FETHNEY, JOHN RICHARD, M.P.S., 59 Grant Street, Burghhead, Moray.
- 1945—FLOWER, Miss WINIFRED U., B.Sc., Training College, Jordanhill, W.3.
- 1939—FORBES, ED. J., M.A., 9 Agnew Avenue, Coatbridge.
- 1945—FORREST, ARCHIBALD, 1389 Pollokshaws Rd., S.1.
- 1933—FORREST, JAMES, 21 Graystone Avenue, Rutherglen.
- \*1920—FRASER, ALEX. R., Aveland Road, Callander.
- 1944—FREW, JOHN, 44 Auchingramont Road, Hamilton.
- 1945—GALLOWAY, THOMAS, 29 Morningside Street, E.1.
- 1941—GARDNER, J. ALLAN, Parkview, Plains, Airdrie.
- 1943—GIBB, Miss AGNES, M.A., 24 Keir Street, S.1.
- \*1911—GLADSTONE, Sir HUGH STEUART, Capenoch, Penpont, Dumfries.
- 1944—GLEGG, DAVID BAIRD, M.A., 15 Douglas Gardens, Uddingston.
- 1934—GLEN, Mrs. MARY, M.A., 160 Queen's Drive, S.2. Mem. Bot. Section.
- 1935—GLEN, Miss MARY, B.Sc., 160 Queen's Drive, S.2. Mem. Council.
- 1943—GORDON, T. H. M., 71 Croftmount Avenue, S.4. Convener Ento. Section.
- 1936—GRAHAM, JAMES C., 64 Walton Street, S.1. Vice-President; Librarian from 1937; Mem. Ento. Section.

- 1932—GRAHAM, JAMES D. P., 4 Tudor Road, W.4.  
Librarian, *And. Nat. Soc.*, 1936-1938.
- 1939—GRAY, ROBERT, 31 Knightsbridge Crescent, S.4.  
Mem. Orni. Section.
- 1941—GRAY, Mrs. ROBERT, 31 Knightsbridge Crescent,  
S.4.
- \*1927—GRONBECH, Miss NANCY H. C., 110 Hill Street,  
C.3.
- 1945—HART, JAMES Y., 33 Kelvingrove Street, C.3.
- 1942—HARTLEY, WALTER GILBERT, B.Sc., F.R.M.S.,  
Greenhill, Kilcreggan, Helensburgh.
- 1943—HAWTHORN, JOHN W., 32 Elmore Avenue, S.4.
- 1939—HEADLEY, Miss ELLA, 6 Stamperland Drive,  
Clarkston, Renfrewshire.
- 1937—HODGE, ROBERT, 85 Ashdale Drive, S.W.2.  
Librarian since 1939.
- 1944—HOGG, J. C., Ministry of Labour, 65 Renfield  
Street, C.2.
- 1942—HOLLOWAY, LIONEL EDGAR, F.G.S., Ravens-  
craig, Paisley Road, Renfrew. Mem. Geol.  
Section.
- 1943—HOOD, Miss RHODA W., 357 Pollokshaws Road,  
S.1.
- †1921—HOPKINS, NICOL, 16 Rosebery Street, C.5. Mem.  
Orni. Section. Joined *Glas. Nat. Hist. Soc.*, 1927.
- 1940—HUNTER, JAMES G., B.Sc., A.R.I.C., 61 Glasserton  
Road, S.3.
- 1940—HUNTER, JOHN, 61 Glasserton Road, S.3.
- †1906—JAMIESON, WILLIAM, 33 Greenholm Avenue,  
Clarkston, Renfrewshire. Mem. Zoo. and Orni.  
Sections; Mem. Publ. Committee; Hon. Secy.,  
*And. Nat. Soc.*, 1915-1923; Hon. Secy., *G. and  
A.N.H. and M. Soc.*, 1932-1941.
- 1943—JEPPS, Miss MARGARET W., M.A., D.Sc., Depart-  
ment of Zoology, Glasgow University, W.2.
- 1935—JOHNSTONE, ROBERT H., M.A., 726 Anniesland  
Road, W.4. Hon. Treasurer since 1936.
- 1946—KEANEY, THOMAS, B.Sc., 3 Muslin Street, S.E.
- 1942—KERR, ROBERT, 61 Bentinck Drive, Troon,  
Ayrshire.
- ‡1904—KING, Prof. LEONARD, A.L., M.A.(Cantab),  
F.R.S.E., Ivy House, Ockbrook, Derby. Mem.  
Ento. and Zoo. Sections; President, 1934, 1935  
and 1936. Joined *Glas. Nat. Soc.*, 1906. Hon.  
Mem. *Micro. Soc.*, from 1907; President *Micro.  
Soc.*, 1909-1913 and 1919-1930.



- 1935—KIRKWOOD, JAMES, 11 Dunchurch Road, Oldhall, Paisley. Mem. Geol. Section.
- 1942—LAIDLAW, Dr. W. B. R., Dilwara, Station Road, Muirhead.
- \*1927—LAUDER, THOMAS, 12 Adamswell Street, Springburn. Librarian, *And. Nat. Soc.*, 1931-1936. Librarian, *Glas. Nat. Hist. Soc.*, 1927-1930.
- †1885—LEE, JOHN R., 96 Finlay Drive, E.1. Mem. of Council; Mem. Bot. Section; Mem. Publ. Committee; Delegate to the Corresponding Societies of the *British Association*. Joined *Glas. Nat. Hist. Soc.*, 1896; Joined *Micro. Soc.*, 1919. President, *And. Nat. Soc.*, 1930 and 1904; President, *Glas. Nat. Hist. Soc.*, 1911-1914; President, *G. and A.N.H. and M. Soc.*, 1931, 1932 and 1933. Original Member *And. Nat. Soc.*
- 1944—LEITCH, ARCHIBALD, B.Sc., 8 Mainhill Place, Baillieston.
- †1900—LESLIE, JOHN DUNCAN, 8 Kelvinside Gardens, E., Glasgow, N.W. Mem. of Council; Mem. Ento. Section; Representative to *West of Scotland Field Studies Council*; President, *G. and A. N. H. and M. Soc.*, 1943, 1944 and 1945. Hon. Secy. *Micro. Soc.*, 1907-1920. Joined *Glas. Nat. Hist. Soc.*, 1920.
- 1943—LIDDELL, GAVIN, 2 Weir's Lane, Carluke.
- 1945—LINDSAY, ARCHIBALD R., B.Sc., A.R.C.Sc., 23 Dorian Drive, Clarkston, Glasgow.
- 1934—LLOYD, Miss BLODWEN, Ph.D., 19 Pembridge Gardens, London, W.2.
- 1945—LOTHIAN, DANIEL M., Backhill Cottage, East Hallside, Cambuslang.
- 1938—LOTHIAN, J. P., 59 Palmer Avenue, W.3.
- †1908—LUNAM, GEORGE, 90 Marlborough Avenue, W.1. Mem. Bot. Section; Former Hon. Secy. *And. Nat. Soc.* and of *Glas. Nat. Hist. Soc.*
- †1908—MACALLISTER, GEORGE W., M.A., Whimbrel, Sandringham Drive, Newton Mearns. Mem. Orni. and Zoo. Sections; Editor, "*Glasgow Naturalist*," 1935-1939.
- 1941—McCALLUM, Miss ADA, B.Sc., 22 Terregles Avenue, S.1.
- 1942—McCLELLAND, S., M.A., 7 Ann Street, Enniskillen, N. Ireland.
- \*1910—McCUTCHEON, WILLIAM, B.Sc., B.A.(Lond.), 89 Argyle Road, Saltcoats.



- †1923—MACFARLANE, Miss BARBARA, M.A., 42 Rowallan Gardens, W.1.  
 1944—MACFARLANE, CHARLES DUNCAN, 7 King Edward Road, W.3.  
 1944—MACFARLANE, Mrs. ELIZABETH ADAMSON, 7 King Edward Road, W.3.  
 1942—MACINTYRE, AIRD, 15 Manor Road, Drumchapel.  
 1941—McINTYRE, WILLIAM, 51 Calderwood Road, Rutherglen.  
 1944—MACKAY, J. MARTIN, 18 Ralston Road, Bearsden.  
 1944—MACKECHNIE, DAVID A., 58 Maxwell Avenue, Westerton, Glasgow.  
 1924—MACKECHNIE, ROBERT, B.Sc., 9 Skirving Street, S.1. Mem. Bot. Section.  
 \*1906—McKEITH, T. THORTON, Burndale, Kilmacolm. Mem. Orni. Section.  
 1943—McKENZIE, Miss MARGARET A., c/o Hall, 19 Lindsay Drive, W.2.  
 1942—McKINNA, Miss MARY E. T., 150 Locksley Avenue, W.3. Mem. of Council; Mem. Geol. Section.  
 1944—MACLAURIN, ALAN M., Oldhall House, Kilmacolm.  
 1910—MACLEAN, ALEXANDER C., M.A., B.Sc., 324 Wedderlea Drive, S.W.2.  
 1938—MACLEAN, GEORGE, F.R.M.S., 70 Hermitage Avenue, W.3. Mem. Geol. and Phot. Sections.  
 †1896—McLEAN, ROBERT, M.A., 9 Cadzow Drive, Cambuslang. Mem. Bot. and Phot. Sections. Former Hon. Secy. *And. Nat. Soc.* Joined *Glasgow Nat. Hist. Soc.*, 1900.  
 †1929—McLEAN, WILLIAM, F.G.S., Low Palacerigg, by Airdrie. Mem. of Council; Mem. Geol. Section.  
 †1900—McLELLAN, Miss J., 34 White Street, W.1.  
 1939—McNEILL, CHARLES, 7 Drumbottie Road, N.  
 †1926—McPHAIL, JAMES, 98 Randolph Road, W.1.  
 \*†1927—MACQUEEN, JOHN, 47 Marlborough Road, Newport, Mon.  
 1945—MACRAE, Miss JEAN G., M.A., 170 Airbles Road, Motherwell.  
 †1928—MACTAVISH, Miss JANET B., Barnagad, Kilmacolm.  
 1944—McVEAN, DONALD N., B.Sc.(Agric.), N.D.A., 27 Huntly Avenue, Giffnock.  
 1938—McVEAN, DUNCAN A., M.A., B.Sc., 27 Huntly Avenue, Giffnock.  
 †1921—MAIN, Mrs., 44 Victoria Park Drive South, W.4.  
 1940—MARTIN, THOMAS, 946 Dumbarton Road, W.4.  
 1943—MAXWELL, J. HARRISON, M.A., F.S.A.(Scot.), 21 Tay Crescent, Riddrie, E.1.

- 1934—MEIKLE, Miss AGNES ADAM, B.Sc.(Agric.),  
F.R.E.S., c/o Paton, 184 Nithsdale Road, S.1.  
Convener, Zoo. Section; Mem. Ento. Section;  
Representative to the Committee of the *Scottish  
Marine Biological Association*.
- 1934—MILLAR, Miss KATHLEEN J., 23 Milner Road, W.3.
- 1934—MILLAR, MATTHEW, 23 Milner Road, W.3.
- 1931—MILLER, Dr. JAMES B., Brownswood, Bishopbriggs.
- \*†1920—MILNE, JAMES FAIRWEATHER, M.A., M.B.,  
Ch.B., Rocksley House, Boddam, Peterhead.
- 1933—MILROY, WILLIAM, 67 Maxwell Avenue, Westerton.
- 1931—MIRLEES, WILLIAM, 3 Belleisle Street, S.2.
- 1931—MORGAN, CHARLES J. E., 22 Willowbank Crescent,  
C.3.
- 1931—MORGAN, WILLIAM, 21 Caldwell Avenue, W.3.
- 1943—MOWAT, G. T., M.B., F.R.C.S.(Edin.), 10 Park  
Circus, C.3.
- 1942—MURDOCH, ALEX., 107 Maxwell Avenue, Westerton.
- 1939—NICOL, JAMES S., 64 Merryburn Avenue, Giffnock.
- 1939—NICOL, Mrs. J. S., 64 Merryburn Avenue, Giffnock.
- †1901—NISBET, THOMAS, M.A., 231 East Clyde Street,  
Helensburgh. President, *And. Nat. Soc.*, 1919  
and 1920.
- 1942—OSBORNE, HENRY, 86 Durward Avenue, S.1. Mem.  
Geol. Section.
- 1941—PARKINSON, SAMUEL, 22 Lindsay Drive, W.2.  
Mem. Geol. Section.
- 1931—PARLANE, JAMES, 23 Holeburn Road, S.3.
- 1942—PATERSON, GAVIN, 15 Lloyd Avenue, E.2.
- 1944—PATTON, ANDREW D., 51 Kirkland Park Avenue,  
Strathaven.
- †1910—PATTON, DONALD, M.A., B.Sc., Ph.D., F.R.S.E.,  
F.G.S., 15 Jordanhill Drive, W.3. Editor of  
Transactions from 1940; Convener Publ. Com-  
mittee; Mem. Bot. and Geol. Sections. Joined  
*Glas. Nat. Hist. Soc.*, 1919; President, *And. Nat.  
Soc.*, 1925 and 1926; President, *Glas. Nat. Hist.  
Soc.*, 1926-1929.
- 1944—PETRIE, Miss WINIFRED, 8 Drumlin Drive,  
Milngavie.
- \*1909—PETTIGREW, WILLIAM M., 19 Selborne Road, W.3.  
Mem. Phot. Section. Joined *Micro. Soc.*, 1911.
- \*1927—PHILLIPS, Major G. W., A.M.I.Mech.E., F.Z.S.,  
69 Deanwood Avenue, Muirend, S.4.
- 1931—PIRRET, JOHN, 138 Mansel Street, N.

- 1943—POYNTING, LEO F., Blairhill, Crawfordjohn, Lanarkshire.
- 1936—PRASHER, RICHARD, 19 Peesweep Row, Dalry, Ayrshire. Convener, Bot. Section.
- 1934—RAE, GEORGE M., 26 Nethervale Avenue, S.4.
- 1931—RAPPA, W. A., 102 Ashfield Street, N.
- †1930—READMAN, W. A., 21 Hamilton Drive, W.2.
- †1901—RENNIE, WILLIAM, 107 Kirkland Street, N.W. Mem. Publ. Committee; Mem. Geol. Section. Joined *Glas. Nat. Hist. Soc.*, 1903. Librarian, *Glas. Nat. Hist. Soc.*, 1917-1936.
- \*1915—RENOUF, Prof. LOUIS PERCY WATT, B.A., Dip. Agr.(Cantab.), D.Sc., M.R.I.A., F.R.S.E., St. Philomena's, Tivoli, Cork. Secy., *Glas. Nat. Hist. Soc.*, 1919-1921.
- †1926—RICHARDSON, JAMES, F.R.E.S., F.R.M.S., 104 Bothwell Street, C.2.
- 1940—ROBERTSON, IAN, B.L., 1768 Great Western Road, W.3. Mem. Orni. Section.
- †1902—ROBERTSON, JAMES M., Garrionbank, Dalserf, Larkhall.
- †1902—ROBERTSON, Mrs. MARGARET, 8 Hillside Avenue, Clarkston, Glasgow.
- 1934—ROBERTSON, THOMAS, 8 Hillside Avenue, Clarkston, Glasgow. Convener, Orni. Section.
- 1945—ROSS, HUGH, 61 Sinclair Drive, S.2.
- †1910—RUSSELL, THOMAS T., 362 Castlemilk Road, S.4. Mem. Ento. Section.
- †1901—RUSSELL, WILLIAM, 69 Lochlea Road, S.3. Vice-President; Mem. Ento. Section; Mem. Publ. Committee; Trustee; President 1937, 1938 and 1939; President, *And. Nat. Soc.*, 1929 and 1930.
- 1943—SCASE, R. P., Lower Northend Farm, Batheaston, Bath, Somerset.
- 1935—SCOBIE, JOHN, 18 Carlisle Road, Airdrie.
- 1931—SCOTT, Miss MABEL G., M.A., B.Sc., 29 Shawhill Road, S.1. Mem. Bot. and Micro. Sections.
- 1945—SEATON, JAMES, 148 Berwick Drive, Cardonald, S.W.2.
- †1894—SHANKS, ARCHIBALD, Templand, Dalry, Ayrshire. Joined *Glas. Nat. Hist. Soc.*, 1908.
- 1945—SHEARER, Miss LILIAN G., B.Sc., 37 Kilmarnock Road, Giffnock.
- \*1899—SHEPHERD, D. ARTHUR, 61 London Road, Kilmarnock.
- 1943—SIME, DAVID, 80 Great Western Road, C.4.



- 1942—SMITH, Lieut. F. W., High Mains, Closeburn, Dumfries.
- 1944—SMITH, JAMES, 150 Garrioch Road, N.W.
- †1922—SMITH, JOHN T., 1 Abbey Drive, W.4. Mem. Micro. Section.
- 1933—SPITTAL, Miss MARY M., M.A., 51 Langside Drive, S.3.
- †1929—STEWART, D. M., C.I.E., M.A., LL.D., Rosemount, East Chapelton Avenue, Bearsden. Mem. Geol. Section.
- †1929—STEWART, Mrs. D. M., Rosemount, East Chapelton Avenue, Bearsden.
- †1910—STEWART, EDWARD J. A., M.A., B.Sc., 8 Manor Road, W.4. Trustee; Mem. Bot. Section; President, *And. Nat. Soc.*, 1927 and 1928; Editor, "*Glasgow Naturalist*," 1920-1930. Joined *Glas. Nat. Hist. Soc.*, 1919.
- 1943—STEWART, JOHN, 8 Dolphin Road, S.1.
- 1931—STEWART, JOHN A., F.S.A.(Scot.), Bonaly, Clynder, Helensburgh.
- 1943—STOLLERY, ERNEST N. R., 51 Allison Street, S.2. Mem. of Council; Mem. Geol. Section.
- 1943—STOLLERY, Mrs. MARY T., 51 Allison Street, S.2.
- 1938—SWORD, WILLIAM C., M.A., 18 Eastcote Avenue, W.4.
- 1943—SYME, VICTOR M., 41 Maxwell Avenue, Westerton, Bearsden.
- 1931—THOMSON, A. L., Rothes, Belhaven Terrace, Wishaw.
- 1944—THOMSON, Miss ISABEL P., 21 Keir Street, S.1.
- 1931—THOMSON, JAMES C., 392 Kilmarnock Road, S.3.
- 1940—VERNON, Rev. EDWARD T., M.A., 26 Cleveden Road, W.2.
- 1937—WALLACE, JAMES MEIGHAN, B.Sc., M.B., Ch.B., Eversley, Fullarton Drive, Seamill, West Kilbride, Ayrshire.
- 1933—WALLACE, WILLIAM STIRLING, 124 Westmuir Street, E.1.
- 1936—WALTON, Prof. JOHN, M.A., D.Sc., F.R.S.E., Department of Botany, The University, Glasgow. President.
- 1937—WATSON, Miss JEAN H., 10 Waverley Park, S.1.
- 1942—WATSON, JOHN S., 49 Bolivar Terrace, S.2.
- 1933—WATSON-BAKER, WILFRED ERNEST, A.Inst.P., F.L.S., F.R.M.S., F.Z.S., Wainholm, Toddington, Beds., 313 High Holborn, London, W.C.1.
- 1944—WATT, JAMES A., 3 Glen Road, Springboig, E.2.



- 1941—WEIR, W.M., 110 Garthland Drive, E.1.  
 1938—WELSH, ADAM, Ben Lawers, Polmont.  
 1943—WHITE, ROBERT M., A.R.P.S., 125 Shawmoss  
 Road, S.1.  
 1943—WHYTE, R. F., M.A., 53 Craw Road, Paisley.  
 1943—WILSON, HARRY, An Taigh, Cyprus Avenue,  
 Johnstone.  
 1944—WILSON, WILLIAM S., M.B., Ch.M., 180 Glasgow  
 Road, Paisley.  
 1934—WOOD, JAMES R., C.A., 1 Woodend Drive, W.3.  
 Auditor.  
 1933—WOODGER, A. G., 11 Daleview Avenue, W.2. Mem.  
 Micro. Section.  
 †1926—WOODLAND, Miss PHYLLIS, 112 Maxwelton Road,  
 East Kilbride. Hon. Secretary from 1942; Mem.  
 Micro. Section.  
 1946—WOTHERSPOON, ALISTAIR, 46 Diana Avenue,  
 W.3.  
 1945—YONGE, Prof. C. M., D.Sc., F.R.S., Department of  
 Zoology, The University, Glasgow.  
 1931—YOUNG, Miss GERTRUDE A., 5 Woodlands Terrace,  
 C.3  
 1931—YUILL, Miss ANNIE, 194 Drymen Road, Bearsden.

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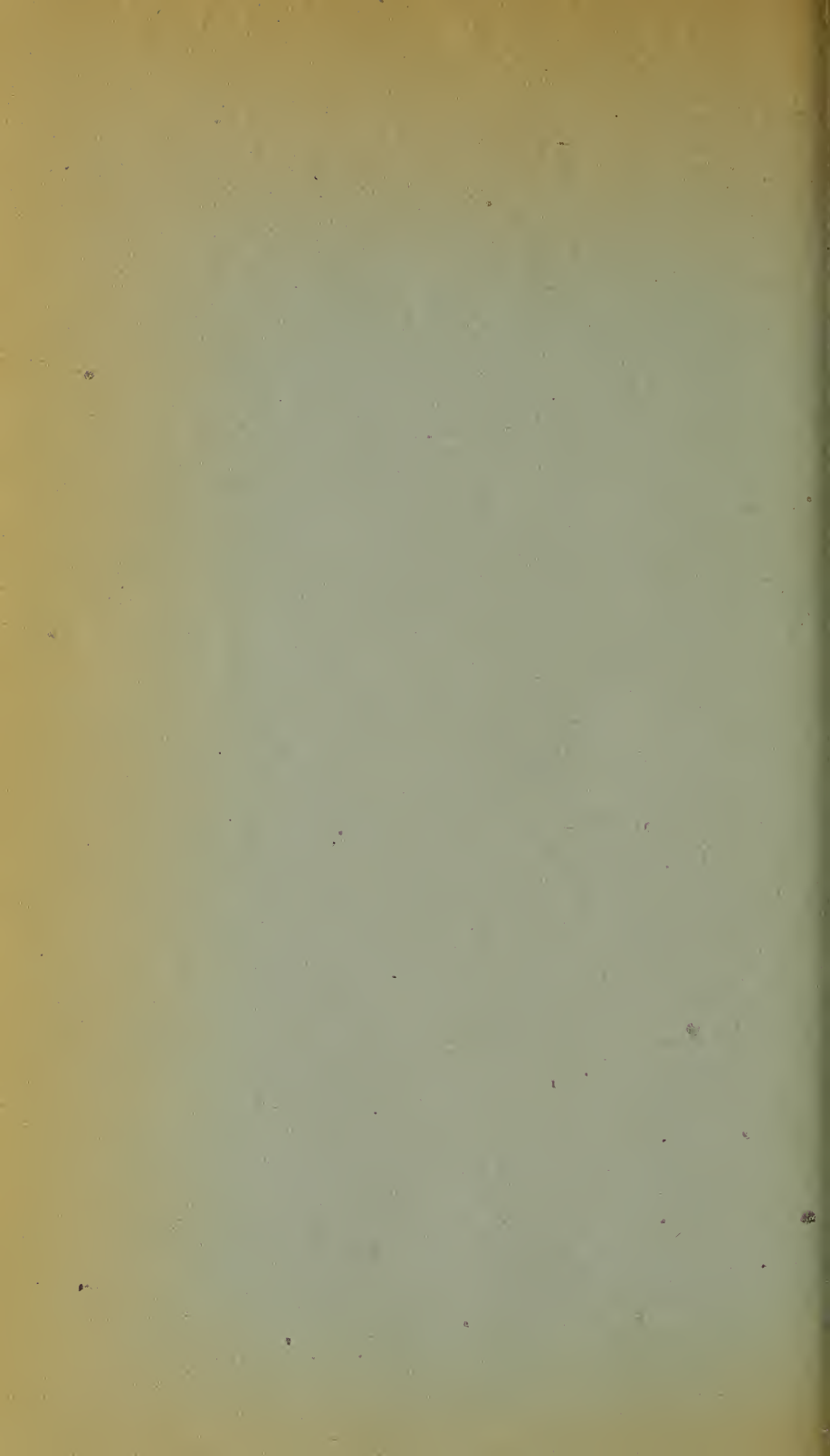
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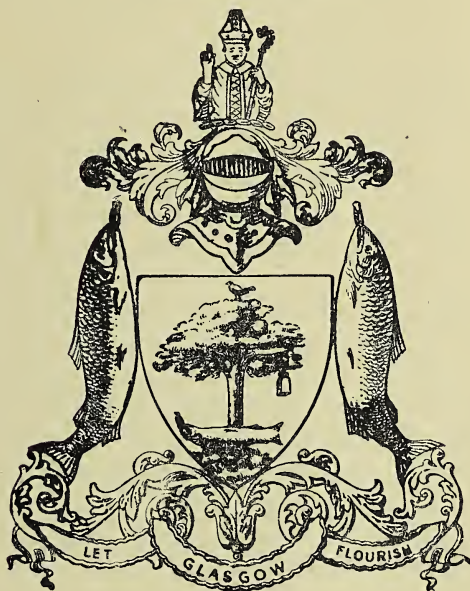


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Vol. XV. Part III

October, 1949

## KENMURE ROOKERY

BY WILLIAM RENNIE

10th June, 1946.

In 1936 I submitted to this Society a census of the rook nests at Kenmure House, Bishopbriggs, from 1912 (see *Glasgow Naturalist*, Vol. XII).

The annual count of the nests was continued during the last ten years, thereby completing a 35-year census.

The number of rooks in and around the rookery has been steady for several years.

In the period 1919-1944 inclusive, the nesting was confined to a given area with no sign of extension. In 1945 the rooks occupied a few more trees to the westward. This year (1946) a further extension has taken place in this direction. For several years back a single nest—very rarely two nests—occupied the trees in front of the House; this year the number has increased to eight nests over five trees.

As can be seen from the graph,\* the number of trees used in 1937 was 26, and a gradual increase doubled this number by 1946. Over the first five years of this period the number of nests increased from 155 to near 200, after which it fluctuated around this number with a maximum of 209.

Illustrative of the expansion of the Rookery, if these ten years are compared with the previous ten there can be seen

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to be an increase of 80 per cent. in the number of occupied trees, from 207 to 372; and an increase of  $76\frac{1}{4}$  per cent. in the number of nests, from 1045 to 1842.

As the number of trees used during the last 10 years increased there has been a fall in the number of nests on that tree which for many years had the largest number of nests on one tree.

During the 35 years 842 trees have been used to house 3992 nests.

Regarding the implications of these figures, it is interesting to find that the Board of Agriculture are taking an active interest in the Census of Rooks nesting in Scotland.

The extensive Housing Scheme delayed by the recent wartime restrictions, which was proposed for this area, will likely be proceeded with shortly and will mean a further encroachment on the Rookery preserves. Knowing the tenacity of the rook, it will be interesting to see the effect of this intrusion.

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\* Editor's Note.—As the graph mentioned in the above paper could not conveniently be reproduced a table is given of the relevant figures.

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#### LAST ELEVEN YEARS RECORDS RECORDED FROM KENMURE ROOKERY, BISHOPBRIGGS.

| Year<br>of<br>Survey. | Date<br>of<br>Visit. | Number<br>of<br>Nests. | Number of<br>Trees Bearing<br>Nests. | Greatest<br>No. on<br>one Tree. |
|-----------------------|----------------------|------------------------|--------------------------------------|---------------------------------|
| 25th                  | 6-4-1936             | 184                    | 29                                   | 38                              |
| 26th                  | 5-4-1937             | 155                    | 26                                   | 34                              |
| 27th                  | 25-3-1938            | 168                    | 28                                   | 23                              |
| 28th                  | 31-3-1939            | 173                    | 32                                   | 22                              |
| 29th                  | 4-4-1940             | 197                    | 31                                   | 20                              |
| 30th                  | 1-4-1941             | 180                    | 31                                   | 14                              |
| 31st                  | 4-4-1942             | 209                    | 40                                   | 19                              |
| 32nd                  | 1-4-1943             | 204                    | 43                                   | 22                              |
| 33rd                  | 4-4-1944             | 191                    | 42                                   | 20                              |
| 34th                  | 29-3-1945            | 208                    | 47                                   | 16                              |
| 35th                  | 1-4-1946             | 207                    | 52                                   | 18                              |

ANALYSIS OF CENSUS OF COUNTS TAKEN DURING THE  
PERIOD 1912 1946 AT KENMURE ROOKERY, BISHOPBRIGGS.

| Number of<br>Nests per Tree. | Number of Trees. | Total<br>Number of Nests. |
|------------------------------|------------------|---------------------------|
| 1                            | 236              | 236                       |
| 2                            | 119              | 238                       |
| 3                            | 113              | 339                       |
| 4                            | 54               | 216                       |
| 5                            | 65               | 325                       |
| 6                            | 47               | 282                       |
| 7                            | 33               | 231                       |
| 8                            | 34               | 272                       |
| 9                            | 28               | 252                       |
| 10                           | 25               | 250                       |
| 11                           | 18               | 198                       |
| 12                           | 15               | 180                       |
| 13                           | 6                | 78                        |
| 14                           | 12               | 168                       |
| 15                           | 7                | 105                       |
| 16                           | 6                | 96                        |
| 17                           | 1                | 17                        |
| 18                           | 6                | 108                       |
| 19                           | 2                | 38                        |
| 20                           | 3                | 60                        |
| 21                           | 3                | 63                        |
| 22                           | 4                | 88                        |
| 23                           | 1                | 23                        |
| 24                           | 1                | 24                        |
| 33                           | 1                | 33                        |
| 34                           | 1                | 34                        |
| 38                           | 1                | 38                        |
| —                            | —                | —                         |
| —                            | 842              | 3992                      |
| —                            | —                | —                         |



## NOTE ON THE OCCURRENCE OF A WALRUS IN THE FIRTH OF CLYDE

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BY PROFESSOR SIR JOHN GRAHAM KERR

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(Communicated by Dr. Patton.)

In the course of overhauling an accumulation of old personal papers I have been so fortunate as to come across the diary in which is recorded my observation of a Walrus in the Firth of Clyde in the year 1884, and in view of the comparative scarcity of records of this Arctic animal on the coasts of Scotland, it seems desirable to have it embodied in the *Glasgow Naturalist*. It is true I was a very young observer at the time, but the wording of my diary leaves no doubt as to the accuracy of my observation. The reference reads as follows:—

“ August 8th (1884). In the afternoon we went over to Ettrick Bay. We saw a shoal of Porpoises and also a Walrus. We got rather a surprise when we saw the head of the latter adorned with large tusks rise in the water quite near us. It soon dived, and we lay quite still expecting it to rise again. This it soon did, and we watched it for some time.”

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# **LIST OF FIRST ARRIVALS OF SUMMER BIRDS IN CLYDE AREA IN 1946, COMPILED FROM REPORTS OF MEMBERS AND FRIENDS**

BY THOMAS ROBERTSON.

| Bird.                         | Date.                                  | Locality.   | Av. Date<br>over<br>54 years. | Earliest<br>Date, 1945. |
|-------------------------------|--|---|-------------------------------|-------------------------|
| Lesser Black-<br>Backed Gull. | Feb. 7th.<br>Mar. 14th.<br>Mar. 14th.  | Linn Park,<br>Glasgow.<br>Glasgow<br>Harbour.<br>Largs.     | Mar. 11th.                    | Mar. 7th.               |
| Wheatear.                     | Mar. 24th.<br>Mar. 30th.               | Southend,<br>Kintyre.<br>Fairlie.                           | Mar. 26th.                    | Mar. 18th.              |
| Chiffchaff.                   | Mar. 29th.<br>Mar. 31st.<br>Apr. 8th.  | Southend,<br>Kintyre.<br>Dalry.<br>Pollok Park,<br>Glasgow. | Apr. 8th.                     | Mar. 27th.              |
| White Wagtail.                | Mar. 29th.<br>Apr. 18th.               | Largs.<br>Clyde Park,<br>Motherwell.                        | Apr. 4th.                     | Mar. 22nd.              |
| Sand Martin.                  | Mar. 30th.<br>Mar. 30th.<br>Mar. 31st. | Dumbarton.<br>Lochwinnoch.<br>Darvel.                       | Apr. 9th.                     | Apr. 6th.               |
| Willow Wren.                  | Mar. 31st.<br>Apr. 5th.<br>Apr. 10th.  | Southend,<br>Kintyre.<br>Castlecary.<br>Dalry.              | Apr. 12th.                    | Apr. 6th.               |
| Swallow.                      | Apr. 3rd.<br>Apr. 4th.<br>Apr. 10th.   | Southend,<br>Kintyre.<br>Dalry.<br>Rouken Glen,<br>Glasgow. | Apr. 10th.                    | Apr. 7th.               |

| Bird.                  | Date.      | Locality.                             | Av. Date<br>over<br>54 years. | Earliest<br>Date, 1945. |
|------------------------|------------|---------------------------------------|-------------------------------|-------------------------|
| Common<br>Sandpiper.   | Apr. 15th. | Dalry.                                | Apr. 13th.                    | Apr. 9th.               |
|                        | Apr. 17th. | Southend,                             |                               |                         |
|                        | Apr. 18th. | Kintyre.                              |                               |                         |
|                        | Apr. 18th. | Darvel.<br>Clyde Park,<br>Motherwell. |                               |                         |
| Cuckoo.                | Apr. 19th. | Kilmacolm.                            | Apr. 23rd.                    | Apr. 18th.              |
|                        | Apr. 21st. | Bishopton.                            |                               |                         |
|                        | Apr. 21st. | Motherwell.                           |                               |                         |
| Corncrake.             | Apr. 22nd. | Southend,                             | Apr. 25th.                    | Apr. 19th.              |
|                        | May 2nd.   | Kintyre.<br>Largs.                    |                               |                         |
| Wood Wren.             | Apr. 22nd. | Portincaple,                          | May 3rd.                      | May 12th.               |
|                        | Apr. 22nd. | Loch Long.                            |                               |                         |
|                        | May 14th.  | Garelochhead.<br>Skelmorlie.          |                               |                         |
| Garden<br>Warbler.     | Apr. 23rd. | Kilmacolm.                            | May 10th.                     | May 5th.                |
|                        | May 4th.   | Pollok Park,                          |                               |                         |
|                        | May 10th.  | Glasgow.<br>Darvel.                   |                               |                         |
| Whinchat.              | Apr. 23rd. | Southend,                             | Apr. 28th.                    | Apr. 18th.              |
|                        | Apr. 26th. | Kintyre.                              |                               |                         |
|                        | May 3rd.   | Clyde Park,<br>Motherwell.<br>Largs.  |                               |                         |
| Yellow Wagtail.        | Apr. 25th. | Suummerston.                          | Apr. 21st.                    | Apr. 18th.              |
|                        | May 8th.   | Dalry.                                |                               |                         |
|                        | May 11th.  | Lochwinnoch,                          |                               |                         |
| Tree Pipit.            | Apr. 25th. | Coatbridge.                           | Apr. 23rd.                    | Apr. 18th.              |
|                        | Apr. 29th. | Darvel.                               |                               |                         |
|                        | May 2nd.   | Largs.                                |                               |                         |
| Common<br>Whitethroat. | Apr. 26th. | Clyde Park,                           | May 2nd.                      | Apr. 18th.              |
|                        | May 3rd.   | Motherwell.                           |                               |                         |
|                        | May 3rd.   | Largs.<br>Southend,<br>Kintyre.       |                               |                         |
| House Martin.          | Apr. 29th. | Largs.                                | Apr. 21st.                    | Apr. 20th.              |
|                        | Apr. 30th. | Summerston.                           |                               |                         |
|                        | May 4th.   | Darvel.                               |                               |                         |

| Bird.                         | Date.      | Locality.                            | Av. Date<br>over<br>54 years. | Earliest<br>Date, 1945. |
|-------------------------------|------------|--------------------------------------|-------------------------------|-------------------------|
| Sedge Warbler.                | May 1st.   | Darvel.                              | May 2nd.                      | Apr. 16th.              |
|                               | May 1st.   | Skelmorlie.                          |                               |                         |
|                               | May 5th.   | Coatbridge.                          |                               |                         |
|                               | May 5th.   | Southend,<br>Kintyre.                |                               |                         |
| Blackcap.                     | May 5th.   | Darvel.                              | May 11th.                     | May 17th.               |
|                               | May 11th.  | Tillietudlem.                        |                               |                         |
|                               | May 25th.  | Kilmacolm.                           |                               |                         |
| Swift.                        | May 8th.   | Fairlie.                             | May 2nd.                      | Apr. 28th.              |
|                               | May 8th.   | Kilmacolm.                           |                               |                         |
|                               | May 8th.   | Largs.                               |                               |                         |
|                               | May 8th.   |                                      |                               |                         |
| Terns (Common<br>and Arctic). | May 10th.  | Clyde Park,                          | May 8th.                      | Apr. 30th.              |
|                               | May 11th.  | Motherwell.                          |                               |                         |
|                               | May 11th.  | Largs.                               |                               |                         |
|                               | May 11th.  | Lochwinnoch.                         |                               |                         |
|                               | May 11th.  | South Bute,<br>Southend,<br>Kintyre. |                               |                         |
| Grasshopper<br>Warbler.       | May 11th.  | Lochwinnoch.                         | May 5th.                      | May 19th.               |
| Spotted<br>Flycatcher.        | Apr. 18th. | Ballagan,<br>Strathblane.            | May 11th.                     | May 9th.                |
|                               | May 18th.  | Darvel.                              |                               |                         |
|                               | May 18th.  | Largs.                               |                               |                         |
| Redstart.                     | May 18th.  | Richmond Park,<br>Glasgow.           | Apr. 26th.                    | May 21st.               |

### Treasurer's Report, 1946.

I beg to submit a statement of Receipts and Expenditure for the year ending 31st December, 1946, of which a copy has already been issued to all members.

The total receipts amount to £75 4s. 6d. and the expenditure to £79 1s. 5d., resulting in a reduction of the balance



by £3 16s. 11d. The balance stands at £309 3s. 2d., which includes £100 Life Membership Fund and £100 Marr legacy.

At 31st December, 1946, there were outstanding 46 subscriptions involving 34 members, of whom 23 were one year, 10 two years, and one three years in arrear. Since 31st December, eight of these subscriptions have been disposed of either by payment or deletion from the roll.

During the year a Committee was appointed to consider the finances of the Society. Their recommendations were approved and embodied in a resolution passed at a meeting on 24th September, by which subscriptions from 1st January, 1947, were raised from 6s. and 3s. 6d. to 10s. and 5s. respectively. The effect on 1946 has naturally been trifling, being confined to £4 1s., the extra amount collected on subscriptions paid in advance for 1947.

I wish to forestall criticism by referring to the item of 20 payments in advance at 10s.—£9 10s. This has the appearance of a clerical error, but it is not so. The item includes 18 subscriptions at the full rate of 10s., one of 4s., and one of 6s., both these being part payments of 10s. subscriptions.

R. H. JOHNSTONE.

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### **Annual Report of Librarian.**

Your Hon. Librarians have to report that during the past year endeavour has been made to eradicate unwanted duplicates and books irrelevant to the Society's affairs. The job has not been completed, but should be in the course of the next three months.

Both Local and Foreign exchanges are being checked as to future exchange activities, but this will take some time to complete.

The members of the Society do not appear to be making any more use of our excellent collection than in previous years, no doubt due to the situation of the collection.

JAS. GRAHAM and ROBT. HODGE.

## Report on the Scottish Marine Biological Society (1945-46)

### *Finance.*

H.M. Treasury approved a block grant of £4226 to the Association, to be utilised towards defraying expenditure in connection with marine research at the Millport Laboratory. Out of this sum £52 had to be put aside for the depreciation of the motor boat, and £50 put to a separate Laboratory and Renewals Account. For the first time no condition was attached to the Grant stipulating that the Association should raise a specified quota towards expenditure.

It is, however, gratifying to note that a sum of £1680 16s. 6d. was raised. This is a record figure. This sum is made up from donations, admissions to the Museum, sales, class fees, etc. In the case of visitors to the Museum there was a substantial increase over recent years, 5093 persons having paid for admission. As in previous years, people in Service uniform were admitted without charge.

### *Research.*

The work on British agar has been continued by Drs. S. M. Marshall and A. P. Orr. They also report further work in Loch Craigin on experiments carried out on the effects of different fertilizers on the phytoplankton. Experiments on the growth and breeding of oysters were continued.

Professor C. M. Young made ecological studies on two mud-living molluscs. Dr. A. C. Stephen continued his observations on the population of *Tellina* in Kames Bay. This work has now been in progress for twenty years.

Several other workers were engaged in various problems of marine biological interest: Dr. E. Conway on Ecology of *Gigartina*, Mr. D. F. Byrne on Investigations on British Agar, Miss S. Williams-Ellis on Illustrations of Shore Ecology, Dr. Blodwen Lloyd on Marine Bacteria, Dr. E. A. Flint on Algæ, Dr. H. W. Lissman on Locomotor rhythms in Dogfish, Mr. T. D. M. Roberts on General Zoology, Mr. W. Russell Hunter on *Saxicavā*, Miss M. F. Crow on General Zoology, Professor J. E. Harris on Anti-fouling Problems,

Dr. A. Haddow on the Food of Shags, Mr. H. V. Thompson on Plankton, and Miss J. Walton on the Reproduction of *Leander squilla*.

A team of workers under Mr. K. A. Pyefinch carried on with the problem of Anti-fouling. The general control of the team has been transferred from the Iron and Steel Institute to the British Iron and Steel Research Association. The change has not altered the general plan or scope of the work carried out. Many topics of biological interest have arisen during the year's work: Tendril formation in Calyptoblast Hydroids, Biology and Settlement of Actinula Larva, Degeneration of Colonies of *Tubularia*, Rate of Development of *Phoxichilidium tubulariae*, Settlement of Tubeworms.

#### *Educational.*

The senior class had students from Nottingham, London, Cardiff, Manchester, Aberdeen, Oxford and Cambridge, and the Easter Vacation classes students from Glasgow, Edinburgh, Manchester, Leicester and Exeter. In addition to these, Dr. Conway brought down a party of eight students from the Botany Département of Glasgow University.

During the year lectures were given by members of the Staff in Edinburgh, Glasgow, Rothesay and Arran, while demonstrations and lectures were given to several visiting Societies and School parties.

#### *Buildings, Machinery and Equipment.*

Several minor alterations were made. Two small out-houses were fitted up, one as a paint-mixing room for the use of the anti-fouling research team, and the other to contain a temperature gradient apparatus.

The boatslip is still very much in need of repair and extension.

Very little use could be made of the "Nautilus" owing to shortage of staff and crew. The addition of an inboard motor boat is now more than ever necessary.

AGNES A. MEIKLE,

Representative to the Committee of the Scottish  
Marine Biological Association.



## Report on Year's Activities of West of Scotland Field Studies Council.

BY DR. J. INGLIS CAMERON.

One of the Council's objects is to bring into contact with each other those who are interested, not merely in the natural history and archaeology of our area, but in getting others interested in these subjects as well. It can be said with confidence that a very large number of these contacts have been made during the past year, and much good has resulted and must result from them.

Applications for lecturers and guides have been received from various parts of the West of Scotland, including Greenock, Ardeer, and Glasgow itself. Professor Walton delivered a lecture on "Field Studies" in Kingston Hall at the end of 1946. Held under the auspices of the Glasgow Corporation Libraries Lecture Scheme, about 100 people were present, mostly men; and several persons were as a result introduced to the membership of appropriate societies in Glasgow.

The Natural History Film Production Society, an offspring of the Council, is now firmly on its feet. The Earl of Dumfries, Mr. Joseph McLeod, of B.B.C. fame, Professor Walton, and others are intimately associated with its activities. This is a society in which many Glasgow and Andersonian members will be interested, and which they might well care to join.

The Council's Hon. Interim Secretary, Mr. John Robertson, has inaugurated a Field Studies Circle for Boy Scouts, which holds its indoor meetings in Hillhead High School and the Art Galleries alternately. Scouts from troops all over the Western district of Glasgow are enrolled in this scheme. The varied list of expert lecturers on the programme, which Mr. Robertson has provided for them through his Field Studies Council contacts, is very impressive. This is a scheme which is likely to continue in future years.

It is hoped, I believe, to start a Field Studies Circle at Jordanhill College School under the auspices of its Parent Teacher Association. The intention is for parents, teachers,



and children to go out together on natural history and archaeological excursions. I understand one of the Council's members, Dr. Patton, has been asked to lecture to this Circle.

The Editorial and Editorial Advisory Committées have been very active. A Bibliography of Field Studies books is now in typescript. About 50 foolscap pages are involved. This most useful Bibliography, which will cost somewhere in the region of 6d., will show to what extent these books are available in Glasgow Corporation Libraries, at the same time giving information with regard to library facilities elsewhere in the West of Scotland. The two committees are also preparing a General Guide to Field Studies in the area. 100 pages of typed foolscap are now to hand and are receiving careful editing. Those who have contributed such useful and detailed material are to be warmly thanked. Those who have been privileged to read what has been received to date have every confidence that a minor local classic of unique character should result.

The Dumfriesshire and Galloway Natural History and Archaeological Society have applied for membership, and two representatives are to join the Council. We are greatly indebted to Professor Balfour-Browne for his continued interest in the Council's activities. As a result of his efforts the area of the West of Scotland has had to be extended to include Wigtown, Kirkcudbright and Dumfriesshires.

As the sponsors of this Field Studies Council, the first of its kind certainly in Scotland, the Glasgow and Andersonian Naturalists are, I think, to be warmly congratulated on their pre-vision in supporting this effort.

May I end on a personal note. Much publicity was given to the Easter Holiday Course of the Central Council of Physical Recreation which was held last April at Auchendennan Hostel, Loch Lomond, and attended by some 80 young people. The Field Studies Council was invited to send three lecturers and guides to this nine days' course. Local geology, botany and ornithology were thus brought to the notice of the young people in addition to their outdoor participation in such activities as rowing, sailing, canoeing, tramping,

cycling, fishing, mountaineering, map and compass work, etc. My own visit was a delightful experience, so far at least as the lecturer himself was concerned. One felt that here in the presence of such healthy young people from all over Britain and beyond, and in such beautiful surroundings, one was given a glimpse of the better Britain we all so fervently desire.

## EXCURSION REPORTS.

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LOCH STRIVEN, 30th September, 1946—Conductor.

*Mr. William Russell*

A party of six defied the elements and travelled to Dunoon. This particular excursion was intended to be to the head of Loch Striven, but the coach people at Dunoon had withdrawn the Glendaruel service, the service which would have been ideal for the exploration of the head of Loch Striven. It was ultimately decided to take the bus to the mouth of Loch Striven and walk up the east side of the Loch. When the party arrived at Dunoon the conductor, through excess of zeal to get the party to the head of Loch Striven, failed to get the first connection to the mouth of the Loch, and Ross's Dairies benefited to the extent of six coffees. The weather had not been favourable, but about the time the next bus was due to leave the rain had almost ceased and the party decided to make the venture.

The run from Dunoon to Loch Striven was not as attractive as it can be, the mist lying low on the hills and the atmosphere anything but clear. Shortly after arrival at Loch Striven, however, the weather cleared, and as the party proceeded up the loch the sun broke through and warmed and cheered the members. At this point there is a very fine view looking across to Rothesay Bay and the entrance to the Kyles of Bute, but the mist still obscured the higher levels although the lower slopes were lovely in their autumn colouring, intensified by the sunshine following the rain. It is a level road up the loch with cultivated fields on your right as you start but giving place to woodland as the ground rises more sharply from the loch side.

There is not much space between the road and the shore, but as the road wends northward, briar and bramble riot on the narrow bank and, in summer, should enchant the wayfarer. They had their autumn charm, however, the blackberries in their various shades and the rose-hips giving vivid colouring to the land and seascape.

Time, unfortunately, did not permit of an extensive walk up the shore, and all too soon the party had to turn their faces buswards. By this time the sun was making itself evident to the insect world, and on the return journey two fine specimens of the Peacock butterfly were observed. How these butterflies love the sun! Watch them on a sunlit wall; slowly raising and lowering their wings in evident luxurious enjoyment. Watch them as they fly through the air, one moment with wings in rhythmic motion, the next gliding majestically with wings apparently still. Their colouring is exquisite and blends so well with the bramble blossom and berry.

It is regrettable that only two of the party observed these butterflies, but each to his particular subject. The journey back to Dunoon was uneventful, the weather, however, so changed from the outward run that the scenery had gained in beauty.

WILLIAM RUSSELL.

The following list of plants observed has been compiled by Mr. Prasher, to whom the writer expresses his grateful indebtedness:—

|                                       |                                     |
|---------------------------------------|-------------------------------------|
| Herb Robert .....                     | <i>Geranium Robertianum</i> , L.    |
| Downy Rose .....                      | <i>Rosa tomentosa</i> , Somr.       |
| English Stonecrop .....               | <i>Sedum anglicum</i> , Huds.       |
| Angelica .....                        | <i>Angelica sylvestris</i> , L.     |
| Devel's bit Scabious .....            | <i>Scabiosa succisa</i> , L.        |
| Square-stalked St. John's Wort, ..... | <i>Hypericum tetrapterum</i> Fr.    |
| Least St. John's Wort .....           | <i>Hypericum humifusum</i> , L.     |
| Corn Sow-Thistle .....                | <i>Sonchus arvensis</i> , L.        |
| Foxglove .....                        | <i>Digitalis purpurea</i> , L.      |
| Gipsy Wort .....                      | <i>Lycopus europaeus</i> , L.       |
| Common Skull-cap .....                | <i>Scutellaria gabriculata</i> , L. |
| Wood Sage .....                       | <i>Teucrium Scorodonia</i> , L.     |
| Agrimony .....                        | <i>Agrimonia Eupatoria</i> , L.     |
| Bog Myrtle .....                      | <i>Myrica Gale</i> , L.             |



Portencross to Fairlie—3rd August, 1946.

Ten members and two friends from the locality turned up at West Kilbride on an afternoon when the walking conditions were exceedingly pleasant. It was dry: warm when the sun shone and cool when obscured by cloud. The visibility was excellent and fine views were had of the neighbouring islands.

Leaving the station we proceeded down the road to Portencross noting on the way *Claytonia perfoliata*, Don., which, though not in flower, was still persisting in its old station. The road here runs through the breeding ground of the Corn Bunting, which occurs locally in the West of Scotland, and two of them were seen and heard still in song. Altogether, 30 species of birds were seen during the afternoon.

Arriving at Portencross, a visit was paid to the old castle and a cannon observed, believed to have been brought up from the wreck of one of the galleons of the Spanish Armada.

The harbour was also inspected and then, passing many spinous bushes of the Sea Buckthorn (*Hippophae rhamnoides*, L) we made for the trap dyke at the head of the new pier.

The rocks here were gay with the orange-yellow blotches of the lichen *Xanthosia parietina*, and here, also, were noted two or three Grayling butterflies. The other butterflies seen during the walk were just the common ones and were not abundant.

The flora of this region is of such a varied nature that a Conductor is at his wit's end to know what to include and what to omit. Mention must be made, however, of the Bloody Cranesbill (*Geranium sanguineum*, L.), still growing profusely with the Crow-garlic (*Allium vineale*, L.), and of the Lovage (*Ligusticum scoticum*, L.), on the rocks above high-water mark.

Our route now lay along the old raised sea-beach with the beetling crags of the old sea-cliff, with wave-worn caves along the foot, on our right. Above these a Kestrel was hovering, and a Rock Dove was also seen.



On our left, a fine example of Puddingstone was seen near the water's edge, but as the tide was full, comparatively few birds were seen on the shore at this point.

In the plant world, many August species were still backward, but many worthy of note were observed, including: Knotted Pearl-Wort (*Sagina nodosa*, E. Mey.), Parsley Water-Dropwort (*Oenanthe lachenalii*, G. Mel.), Bog Pimpernel (*Anagallis tenella*, L.), and Lesser Centaury (*Erythraea litoralis*, Fr.), while on the sea-shore proper Glasswort (*Salicornia herbacea*, L.), and Sea-Bite (*Suaeda maritima*, Dum.), were seen in the mud flats with the Sea Rush (*Juncus maritima* Sm.), *J. Gerhardi* Loisel, and the Sea Club-rush (*Scirpus maritima*, L.), in the salt marshes.

This was also a good place for birds, and a large flock of several hundred Oyster catchers were observed, all crowded on a small bank which was still above water. Here occurred also a small mixed flock of Ringed Plovers and Dunlin, while a few Redshanks and Lapwings were also seen about. Off-shore birds included the Eider Duck, Sheld Duck, Gannet, Shag, Common Tern, Herring Gull, Common and Black-headed Gulls.

The fungi found on the excursion were not at all plentiful, less than ten species all told being found, chief of which were *Marasmius orcadæ*, Fr., *Thyrophorus conicum*, Fr., and an incipient mushroom (*Psalliota campestris*, Quel.).

It was interesting, as we walked along, to note that the stones in many of the small brooks were covered by rust which had been washed down from the old red sandstone rocks, while the presence of peat was evident from the oil which came down the brooks also.

Coming in sight of Hunterston House, a conference was held as to the advisability of continuing along by the sand-dunes to the Black Rock and Fairlie. Reason, or rather the desire for a cup of tea before the shops closed won the day, and before long the party had proceeded up Hunterston Avenue and were seated comfortably in a bus on the way back to West Kilbride. Here one might observe House Martins

feeding young still on the nest, and here, also, one might observe a waitress feeding members of the Society still in the best of spirits for travelling conditions had been excellent so far.

And excellent they remained till the party arrived home, seats being easily available in the train, thus making a successful ending to a successful day.

Conductor JOHN BOYD.

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## SECTION REPORTS.

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### Report of Botanical Section, 1946.

Notwithstanding the long spells of inclement weather which prevailed during the summer months of the past year, the Botanical Section were remarkably fortunate in that the fourteen sectional excursions arranged by the Committee were, with one exception, carried out in dry and mostly warm conditions. The exception was an attempt to carry out a second visit to the district around Beith Mill, the scenery of which made such a favourable impression upon those who took part in a similar outing in 1945, which resulted mostly in a drenching such as few of our members had experienced for many years previously. As if to prove that our climate is still capable of outdoing all its own records, this year's weather was, on this occasion, still worse; and, fortunately for them, most of the botanists stayed at home. But two members, coming from opposite directions, reached the rendezvous at Roebank Toll on Saturday, 29th June. Both dutifully carried out part of the programme, although they saw nothing of one another during the time they were battling against the elements. After a brave attempt at a start to walk the distance which had been intended, both gave it up as hopeless; but not until some observations of a botanical nature had been made; and it is worthy of record that a list of forty-eight species of flowering plants in bloom were noted. These included nothing out of the ordinary, but it

is surely a testimony to the enthusiasm of our members that such a list is possible under such circumstances.

All the other sectional excursions were carried out under favourable weather conditions, and were thoroughly enjoyed by those taking part, the average attendance being eleven, the largest number twenty, and the smallest,—apart from Beith Mill—being seven.

The season opened with a visit to the Allander Woods on 23rd March, the main object on this occasion being the study of mosses and hepatics, for which this district usually affords much material of interest. Nothing new, however, was noted, and only a very few of the early spring flowers were seen. The same may be said of the second excursion, which was a visit to Glénarbuck, Bowling, a week later.

A walk from Kilmacolm to Langbank on 13th April afforded a company of fifteen members a most enjoyable ramble over the high ground from which fine views were obtained, and many interesting plants noted, the advance of spring being well indicated by a wild plum tree in full bloom. Thale-cress was among the wayside flowers noted on this occasion.

On 27th April a visit was paid to Seamill, the intention being to revive a feature which has had to be kept in abeyance during the war years, namely, a sea-shore ramble for the study of marine algæ. On this day, however, unlike all the other outings, we encountered a bitter east wind, which rendered the gathering of the seaweeds a somewhat trying task, and although some species of interest was collected, the list was not at all comparable with what had been expected.

An outing to Tilietudlem on 11th May afforded a fresh opportunity to examine the treasures of this favoured locality, the botanical features of which are of perennial interest. Most of the well-known rarities in the glen and around the castle were seen, those in flower including the greater celandine (*Chelidonium majus*), the wall-flower (*Cheiranthus Cheiri*), and the cuckoo-pint (*Arum maculatum*). Around the village of Crossford the apple and pear blossom were seen in fine condition.

An outing to Garelochhead on 18th May resulted in a number of interesting plants being observed, notable amongst them being two rare ferns, the scale-fern (*Ceterach officinarum*) and the hart's tongue (*Scolopendrium vulgare*). Amongst flowering plants were noted the Welsh poppy (*Meconopsis cambria*), the labb's-lettuce (*Valerianella oliteria*), and *Claytonia sibirica*.

On 15th June a visit was paid to Knockewart Loch, a well-known happy hunting-ground for the student of marsh vegetation. There is now little to suggest a "loch" in the proper sense, for the whole area is densely overgrown by mosses; but among the many forms of plant life abounding there are a considerable number of rare species, and an enjoyable time was spent searching for these. The rare sedge *Carex limosa* was found in considerable abundance, bog-bean was plentiful, and amongst other plants the cranberry (*Oxycoccus palustris*) and Bog Stonecrop (*Sedum villosum*) were seen.

An old favourite district was re-visited on 22nd June, when a walk from Blackwood to Lesmahagow was taken. The most notable plants seen on this occasion were *Leontodon hispidus* and *Pyrola minor*. Half-way on the journey the company were entertained to a delightful *al fresco* tea by the local Boy Scouts, to whom a hearty vote of thanks was accorded.

An evening excursion on Wednesday, 26th June, was paid to the always attractive Possil Marsh. There was a fine show of the greater spearwort (*Ranunculus Lingua*), while many of the special plants of the locality, such as *Sium erectum*, *Stellaria glauca*, *Glyceria aquatica*, and *Carex disticha*, were noted in abundance.

On 27th July a visit was paid to Cadzow, when besides the usual ramble round the old castle ruins and among the old oaks of the Forest, a close-up view was had of the white cattle. Plants of special interest noted were *Reseda lutea*, *Hypericum hirsutum*, *Humulus Lupulus*, *Ribes alpinum*, and *Sambucus racemosa*.



On August 10th Mugdock was visited. A search for the spotted dead-nettle (*Lamium maculatum*) which had been a feature of the roadside near the village was unsuccessful, and it is feared that this plant has now disappeared. The well-known specimen of *Pyrus Aria* on the old road beyond the village was noted, and other plants seen included *Sagina subulata*, *Scleranthus annuus*, and *Rubus plicatus*.

Perhaps the most interesting excursion of the series was a visit to Loch Libo on 17th August, when among the great wealth of lake and marsh plants there were observed *Cicuta virosa*, *Galium uliginosum*, and *Lythrum Salicaria*. Disappointment was felt at the disappearance of the water-parsnip (*Sium erectum*) due to the cleaning out of the ditch at the north end of the loch where it grew. A walk to the village of Uplawmoor at the end of the day resulted in the finding of a specimen of *Circaea alpina*—an unusual locality for this species.

The section's activities were brought to a close on 24th August by a walk from Bridge of Weir to Kilmacolm. On the way Killallan Church was visited, and the rare *Scrophularia vernalis* was seen, but past flowering. Plants noted included *Lepidium Smithii* and *Lactuca muralis*.

With regard to the general activities of the Society, we report with satisfaction that Botany continues to hold a prominent place. This fact is reflected in the botanical interest shown in the programmes both of the monthly meetings and of the general excursions arranged by the Council. Of these latter, held on the first Saturday of each month, and on the three public holidays in April, May and September, the most interesting to members of this Section were, perhaps, those to Whistlefield (22nd April), Dunure (27th May), and Portincross (3rd August).

It was unfortunate that the one arranged for a visit to Buchlyvie on 7th September had to be abandoned on account of bad weather, but it might be said that all the outings held during the season had something of interest for the botanists; and although we have no particular item of outstanding

importance to record, the summer of 1946 must be placed among successful seasons of this Section.

RICHARD PRASHER, *Convener*.

## Ornithological Section.

### CONVENER'S REPORT FOR THE YEAR 1946.

As always, the chief work of the Ornithological Section was in the field. In addition to the general Society outings there were nine Sectional excursions, these being to the Allander Woods, Castle Semple Loch, Troon North Shore, Seamill, Dalserf to Tillietudlem, Garelochhead, Knockewart by West Kilbride, Blackwood, and Beith Mill. The variety of terrain covered by all the outings was such that there was a chance of seeing almost all the species of birds commonly to be found in the Clyde Area and also some of the rarer ones, including winter visitors and passage migrants. Actually the number recorded, 89, was of course a good deal less than the possible figure. The most interesting winter species was the Whooper Swan, a flock of which can usually be seen in the season at Castle Semple Loch. The Pintail duck was another visitor to the same sheet of water. Of the passage migrants the Bar-tailed Godwit and the Knot were seen at Troon. The most outstanding of the summer visitors was a Grasshopper Warbler which sang in a very bleak situation beside Knockewart Loch.

With the coming of Spring the members of the Section were once again on the alert to note the first arrival of each species of summer visitor. The list compiled from their reports was given in full at the meeting in June.

In general the year was quite favourable to bird life. There was only one spell of "killing weather" in January, and, fortunately, milder weather set in before the mortality became heavy. The weather during the breeding season was better, on the whole, than it has been for several years past.

The appearance of several large flocks of Waxwings in the late Autumn may have been a warning of the severe weather which did not set in until the year was finished.

The only colony of Roseate Terns in the Clyde Area established itself during the war years, but already it is in danger of extinction, as people have been breaking or removing the eggs in a wholesale manner.

Mr. Thornton MacKeith reported the nesting of the Pochard at Kilmacolm. This appears to be second record for Renfrewshire, it having been discovered at Loch Goin by Mr. Richmond Paton.

THOS. ROBERTSON, *Convener*.

### Annual Report—Geological Section, 1946.

Due to the inclemency of the weather, the excursions arranged for last summer were literally a wash-out. The excursion to Loch Humphrey on 18th May and the excursion from Twechar to Dullatur on 15th June were the only two worth recording. At the former an interesting collection of Zeolites was obtained, while at the latter Barytes in cavities in quartz dolerite lava was found. This is a rather unusual occurrence and worthy of recording.

Since the summer four papers have been read at our Sectional meetings held at 21 St. Andrew's Street, and these have been of the usual high standard.

On 9th October Mr. Stollery read a paper on "Local Minerals" which had obviously been prepared with great care and meticulous detail for which Mr. Stollery is famous.

On 9th November Mr. Holloway tabled a number of specimens and microscope slides of various basalts and read a most interesting paper on this subject.

On 8th December Mr. Cannon gave an address on "Coins and Their Archaeological Implications"; and on January 6th a collection of beautiful lantern slides illustrated a very interesting lecture given by Mr. Kirkwood on "The Geology of the Cape Province of South Africa."

W. J. CANNON.

## Report of the Zoological Section for the Year 1946.

The Clyde Area is rich in stretches of fresh-water of various sizes. Streams are also plentiful.

It is proposed to carry out a survey of the Freshwater Fauna. During the past year Dr. Slack made studies on the plankton fauna of Loch Lomond, and some of the species collected are believed to be new records. Among the Cladoceran species, *Latona setifera* (Mull.) has not been recorded from the Clyde Area. *Holopedium gibberum* Zaddach has been found in Loch Arklet and Loch Doon, but not from Loch Lomond. *Sida crystallina* (Mull.) is common throughout the area.

An interesting observation was the occurrence of the fresh-water Molluscs, *Velveta macrostoma* (Stienbach) at a depth of one hundred feet; while further toward the shore, at a depth of ten feet, it was replaced by *Planorbis lævis* (Alder). Neither of these species appear in the Fauna list for the Clyde Area.

The Convener would be glad to contact any members of the Society who are interested in Freshwater Biology.

AGNES\* A. MEIKLE,  
Convener of Zoological Section.



Session XVI. 1946.

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Zoological.....Miss AGNES A. MEIKLE, B.Sc. N.D.A.

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Ornithological.....THOMAS ROBERTSON.

Microscopical.....GEORGE MACLEAN, F.R.M.S.

Geological.....WILLIAM J. CANNON, F.G.S.

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## SOCIETY MEETINGS

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8TH JANUARY, 1946.

Mr. J. Duncan Leslie presiding at this, the first, meeting of the Sixteenth Session.

The following new member was admitted to the Society :—  
Mr. John Biggar, 2 Westclyffe Street, Glasgow, S.1.

As was the case in former years, this meeting was devoted to exhibits by the Photographic Section. Mr. Hamilton showed a fine series of coloured slides descriptive of a tour of the west coast of Scotland, as well as some plain slides of mountaineering parties in difficult and in humorous situations. The beauty of the photographs and the reality of tone and colour were highly praised by members.

Mr. William Pettigrew showed a number of histological and pathological slides which were ably described by Dr. Inglis Cameron. The sections illustrated the structure of skin, a healing wound, various tumours, eye structure, and the effect of endocrine abnormalities.

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12TH FEBRUARY, 1946.

Mr. J. Duncan Leslie, President, in the chair.

This being the Annual Business Meeting of the Society, the reports of the various conveners and office-bearers were read. These were approved and the following new office-bearers elected :—President, Professor John Walton, M.A., D.Sc., F.R.S.E.; Vice-President, Mr. William Russell; Members of Council, Miss Mary Glen, B.Sc., Mr. J. Duncan Leslie, and Mr. Ernest Stollery.

Miss A. A. Meikle was elected Representative to the Committee of the Scottish Marine Biological Association on the retiral from office of Mr. J. G. Connell; Mr. James Anderson succeeded Mr. George Maclean as Microscopical Section Convener.

Mr. Connell, Mr. Maclean, and the other office-bearers who were retiring were warmly thanked for their services.

The final business of the meeting was the appointment of a committee to investigate the financial position of the Society with regard to subscriptions.

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12TH MARCH, 1946.

Professor John Walton, President, in the chair.

Mr. J. G. Connell gave a talk on the smaller delights of the wayside. The audience were taken on an imaginary tour of an area in the neighbourhood of Ballochmyle, and the fine collection of lantern slides exhibited carried to the audience a great deal of the enthusiasm which the speaker showed for this part of the countryside—an enthusiasm strengthened by intimate knowledge for half a century. The life-histories of dragonflies, descriptions of the various forms of insect life found in ponds and streams, woodland animals, variety in shells, pigmentation in fishes, and the various forms of local crabs were among the many subjects covered in this remarkably fine survey of the natural history of a fairly small area.

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2ND APRIL, 1946.

Professor John Walton, President, in the chair.

Mr. Alistair G. Wotherspoon, 46 Diana Avenue, Glasgow, W.3, and Mr. Thomas Keaney, B.Sc., 3 Muslin Street, Glasgow, S.E., were admitted as members.

The lecturer, Mr. J. Harrison Maxwell, spoke on "The Past Around Us," and emphasised among other points the fact that much material could still be found by the careful and observant investigator during excavations in streets or on the sites of new buildings. Many of the slides which illustrated the lecture showed the tools, urns, weapons, pottery, and other remains collected from the excavations in local Bronze Age cemeteries, of which Mr. Maxwell stated

there were 23 known in the district. One very interesting find was a small saw, reputed to be used for trepanning.

Mr. Maxwell remarked on the curious reluctance of some authorities to accept many tools found in Scotland as being artifacts owing to the fact that they were not manufactured from flint, though they would agree in principle with the statement that where flint was in great scarcity there would be a tendency to use local material.

The audience accorded Mr. Maxwell their warmest thanks for his fine lecture.

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13TH MAY, 1946.

Professor John Walton, President, in the chair.

The following new member was admitted to the Society :—  
Mr. Ernest Simpson, 104 Marlborough Avenue, Glasgow, W.1.

Miss Agnes Meikle mentioned that a specimen of the Snake Fly, *Inocellia crassicornis*, had come to her notice, which was recorded from "Haylie, Helensburgh." As there had been no previous record of this fly from Britain, she asked entomologists to send specimens of Snake Flies collected to Mr. Downs or to herself at the Zoology Department, Glasgow University for verification.

Among a collection of mosses and hepatics exhibited by Mr. J. R. Lee were *Dicranum montanum*, from Glenarbuck, Kilpatrick Hills, which is a new record for the Clyde Area; *Brachythecium populeum* and *Hypnum uncinatum* collected in Bute and new Vice-county records; *Eurhynchium pumilum* from Ettrick Bay, Bute, a rather uncommon moss; *Lophozia attenuata* from Allander Woods and *Radula complanata* and *Frullania fragilifolia* from Portincapple. The lecturer for the evening, Dr. Duncan Leitch of the Geology Department of Glasgow University, very ably outlined the immense subject of "Geology and the Problem of Species." The difficulties and peculiarities of studying fossil evidence of evolution were emphasised; the use of evolutionary series of organisms in fixing the stratigraphical position of beds



of uncertain age; and the new concept of an evolutionary tree which is not in its finer details of a bifurcating type but has innumerable ascending branches which can interweave and even become reticulated—representing measurable characters and not individuals or groups. The species in a very complex case may thus become only a statistical entity and be limited purely by the desire of the investigator to isolate particular characteristics. Dr. Leitch showed many slides illustrating the evolution of Cretaceous Micrasters, Carboniferous Corals and Non-marine Lamellibranchs, and the oysters of the Liassic period showing the *Ostrea-Gryphea* series.

A hearty vote of thanks was accorded for this most interesting lecture.

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#### 10TH JUNE, 1946.

Mr J. Duncan Leslie, Vice-President, in the chair.

A brief obituary was read by Mr. J. R. Lee on the life of his friend, Mr. Hugh A. Brown, who died on 11th May, 1946.

Mr. William Rennie submitted a census of the rookery at Kenmure House, Bishopbriggs, for the period 1937-1946, which brings the record to date from 1912. (See p. 101)

After the reading of excursion reports, Mr. Thomas Robertson submitted his list of Early Arrivals of Migratory Birds. (See p. 105)

The company then adjourned to view the Annual Exhibition prepared by members. There was a fine display of plants, including an unusually large collection of ferns shown by Mrs. and Miss Glen. A Library exhibit by Mr. Graham and Mr. Hodge included early minute books and transactions of the Ray Society and the Glasgow Natural History Society.

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#### 24TH SEPTEMBER, 1946.

Professor John Walton, President, in the chair.

One application for membership was approved, Miss

Margaret G. McColm, 10 Borden Road, Jordanhill, Glasgow.

As a sequel to the investigations of the committee appointed to study the question of subscriptions, a motion was passed increasing the subscription rates from 6/- and 3/6 to 10/- and 5/- as from the beginning of 1947.

An obituary notice for Professor Bryce (page 132) and one for Mr. J. G. Connell (page 136) were read by the President.

The lecturer, Mr. Jas. Richardson, F.R.E.S., F.R.M.S., gave an outline of the work carried out by himself and some of his colleagues connected with the Army School of Hygiene. This branch of the Service was established in 1938 and, on the outbreak of war, expanded rapidly by engaging a large staff of experts in medicine and its borderline sciences. Mr. Richardson described the formation of a Museum of Tropical Hygiene and the difficulties of stocking it when the main stock in hand was initiative and enthusiasm and an absolute minimum of material.

One spell of experimentation described was of six months work near Basingstoke on mosquito research.

A film showing the manufacture and uses of DDT, insecticide and its application in forests, swamps and ruined towns greatly interested members; while there was an instructive display of photographs, models and samples.

The meeting closed with the display of specimens of *Ledum palustre* (L.) from Flanders Moss and *Spartina Townsendii* (Groves), the hybrid between *S. alterniflora* Lois. and *S. stricta* Roth., from the Suffolk coast.

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8TH OCTOBER, 1946.

The eighth meeting of the session, with Mr. Wm. Russell, vice-president, in the chair.

Obituary notices of Mr. Wm. Jamieson and Mr. Donald Dewar were read, also a notice of the appearance of a Walrus in the Clyde Estuary contributed by Professor Graham Kerr.

The main subject of the evening was a lecture by Dr. John Berry on "Freshwater Fisheries and Hydro-electric Development."

Dr. Berry stated that his greatest interest in fishes was from the economic point of view, as a food source and as an attraction to sportsmen.

Apparently, about a century ago, freshwater fishes were much more plentiful, especially those in the Salmonidae, but many only too obvious factors had reduced their numbers. An outline was given of the habits of the salmon and of past investigations into its ecology, while many fine illustrations were shown of the means employed to combat the chief deterrants to the wellbeing of the fish. Some views were shown of the various types of salmon locks and circular salmon passes, and also of the various growth stages of the salmon.

Dr. Berry, after describing the counting of fish by radar, summarised the chief causes of the decline in numbers as being dams, spoliation of spawning beds, disease and parasites.

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12TH NOVEMBER, 1946.

At the ninth meeting of this session, Professor J. Walton, President, took the chair.

Mr. John R. Lee exhibited a specimen of *Ulex galii* from Sandbank. The possibility of confusion arising between this species and *Ulex nanus* was commented upon, and Mr. Lee invited information regarding the record from "Benmore district" of the latter plant.

After the report of the Loch Striven Excursion was read, the main subject, a lecture on "The Effects of Weather on Wild Life during the Past Year," was presented by Mr. John Boyd.

This covered that fascinating subject—the keeping of a country diary or record over a reasonable period of time. Mr. Boyd showed the method by which one could divide into relatively homogenous groups the weather observations which he had made, and how correlations could be made between them and the periods of growths of plants, activity of insects and among birds nesting and song periods.

Two particular points mentioned were the rarity of wild laburnum trees—probably due to the destruction of the seedlings by rabbits—and the change of population balance between thrush and blackbird, due to the hardness of the latter in very cold winters.

10TH DECEMBER, 1946.

Professor John Walton, President, took the chair at this, the tenth, meeting of the session.

One new member, John Weir, Jun., 28 Udston Road, Burnbank, was admitted to the Society; while the obituary notice regarding Mr. Wm. McLean, F.G.S., was read by Mr. W. Cannon.

Dr. Henry Slack delivered a lecture on “The Microscopic Life of Loch Lomond,” which illustrated the zonal ecology of the loch as influenced by variation in light intensity, and the fluctuating viscosity and density of the water due to differences in temperature. He described the tendency in some of the plankton to alter their shape, and through this their surface/volume ratio to counterbalance these variations.

Many fine illustrations were shown, as well as a number of microscopic slides.

Among the organisms mentioned were the following:—

*Gladoceran Crustacea.*

*Bosmina obtusirostris.*

*Daphnia hyalina.*

*Sida crystallina.*

*Holopedium gibberum*

*Rotifera.*

*Notholca* spp.

*Copepod Crustacea.*

*Diaptomus gracilis.*

*Leptodora kindtii.*

*Polyphemus pediculus.*

*Bythothephes longimanus.*

*Phytoplankton.*

*Ulothrix* spp.



## O B I T U A R Y

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### Thomas Hastie Bryce, M.A., M.D., LL.D., F.R.S.E., F.R.S., 1862-1946.

Professor Bryce was educated in Edinburgh and became demonstrator to Sir William Turner in Edinburgh University. In 1890 he was appointed lecturer in Anatomy at Queen Margaret College, and in 1909 was appointed to the Regius Chair of Anatomy in the University. He retired from this post in 1935.

Professor Bryce gained an international reputation as an anatomist, his best-known work being on the early stages of human embryology. He had, however, wider interests in anatomy and osteology, was a most inspiring teacher, and was held in high esteem by generations of University students.

A man of many interests in addition to his work on anatomical subjects, he wrote many memoirs on Scottish Archaeology, and in 1922 was elected Vice-President of the Society of Antiquaries of Scotland. He was also President of the Glasgow Archaeological Society and a member of the Royal Commission on the Ancient and Historical Monuments and Constructions of Scotland. During his curatorship of the Hunterian Museum he did much to improve the arrangement of its treasures. A wide knowledge of the Fine Arts, particularly of painting, led to his becoming honorary curator of the Fine Art Collections in the University. The Board of the Glasgow School of Art claimed his services for a considerable period. He was himself a skilled draughtsman, as shown in the excellence of the illustrations to his works.

On his retiral the University of Glasgow conferred on him the LL.D. degree *honoris causa*. He died at Oxford on May 16th, 1946.

It was a great privilege to be a friend of Professor Bryce. He was a man with great integrity of character and a strong sense of humour; while his loss is mourned by a wide circle of friends.

PROFESSOR JOHN WALTON.

### Donald Dewar

By the death of Donald Dewar on 11th August, 1946, in his 85th year, while on holiday in his native district of Tayvallich, the Society lost one of its oldest members, whether the measurement be in span of life or years of membership. Mr. Dewar, who was a student in the Botany class of the late well-beloved Professor King, joined the Andersonian Naturalists' Society in 1886, the second year of its existence. In 1904 he was appointed joint auditor, a post he held until his death 42 years later.

Mr. Dewar's main interest in the Society's activities lay towards Botany, but he was quite catholic in his curiosity. He would have disclaimed any title to the name of Botanist with either a capital or a small "b," but I am sure he would gladly have accepted the ascription of botanophil in the sense in which that word is used by Andrew Young. His interest took the practical turn in later years of making an annual donation in addition to his subscription.

Mr. Dewar was a well-known member of the Glasgow Gaelic Society, and for a time held the position of Hon. Secretary of the Scottish Patriotic Association.

His unfailing good humour, his courtesy, his fund of anecdote and information on questions of the Gaelic tongue and archæology made him a welcome figure at the Society meetings and excursions, which he attended assiduously up to and during the early years of the war.

He would ask no more of us, I think, than that we should remember him affectionately for his qualities of good companionship.

R. H. JOHNSTONE.

### William Jamieson

By the sudden death of William Jamieson on 30th June at Hunter's Quay, where he was spending a short holiday, the Society lost one of its oldest members. In his eightieth year, he served the Society well on various committees and for a considerable period held the convénership of the Ornithological Section.

Thirty-one years ago, in 1915, he was elected Joint Secretary with the late Mr. Harry Cumming, a post which he held till 1923. He was elected for a second term to this post with Mr. James Anderson in 1932, and for nine long years faithfully performed this duty.

As a member of the Clyde Card Catalogue Committee he did much valuable work in compiling the Ornithological Section of this index to our area, while during his convener-ship he collected and read to very appreciative audiences the "Records of First Arrival of Summer Birds to the Clyde Area."

A very fine paper, "The Birds of the Kelvin," read to the Society in 1932, proved him to be a bird lover above average, and we shall not readily forget our debt to one who in his day did such excellent work.

NICOL HOPKINS.

### **William McLean, F.G.S.**

The death of Mr. William McLean on the 28th August, 1946, was to me a personal loss, and I am sure all the members of our Society who have at any time met or conversed with him felt as I did. Any member who asked for his guidance or help in geological matters, or anyone who at any time attended an excursion led by Mr. McLean, felt that in this man they had met and made a friend. He was one of those people—rare at the present time—who seem to radiate from their own spirit of content an enveloping mantle of quiet happiness which is as balm on the spirit of those of us who spend almost all our days in the squalor and vice of this great city.

Born 69 years ago in a small village in Northern Ireland, he retained the charm of his soft north-western accent, despite the fact that he came to Scotland as a young man still in his teens. Apart from the war years, he visited his home land regularly, at least once a year, and never failed to return with fresh facts of interest to our geologists or archaeologists.

Mr. McLean joined the Andersonian Naturalists in 1929, and although his work in the Society was mainly geological his interests were as wide and varied as those of nature herself. As Convener of the Geological Section for four years, he carried through a valuable survey of the tributaries of the Clyde, and the knowledge of the surface geology thus acquired was written down by him and presented in book form to this Society. Due to ill health, he had to resign as convener of the Section, but continued to give valuable service to the Society as a member of the Council till his death.

Well known and respected in natural history circles throughout this country, he was a member of the Glasgow Geological Society and served on the Committee of that body for a time. He was a Fellow of the Geological Society, and as Curator of the Geological Section of the Airdrie Museum from 1933 he displayed great skill and care in the classifying and cataloguing of the specimens contained therein. He was a member of the Council of the Airdrie Library Committee and gave and conducted geological lectures and rambles. He contributed many articles to the Airdrie Press and took an active part in the formation of the Airdrie and District Philosophical Society in 1929 and remained an enthusiastic member of that Society. Astronomy was another of his interests, and he was frequently to be found in earnest discussion with the Curator of Airdrie Observatory.

Mr. McLean read a paper on the geology of Northern Ireland to our Section in April 1944, and on 7th June, 1945, the Geological Section were led by him in exploring the Airdrie District and he conducted us to a moss or peat bog where he propounded his theory that this was a glacial relic. The following week the Section made a conducted tour of the Airdrie Museum. These two excursions were the last in which he took the leading part and will remain in our memory, not so much from their geological interest as from the fact that Mr. McLean in the role of host was the man himself—striving to please, giving of his best, delighted to serve.

Those of us who knew him will draw inspiration from his memory, and we extend our deepest sympathies to his wife and daughter.

WM. J. CANNON.



### John Gibson Connell, F.R.M.S.

John Gibson Connell, F.R.M.S., passed away very suddenly at his residence, 129 Broomhill Drive, on the 11th June, 1946.

An Ayrshire man, Mr. Connell was educated at Spier's School, Beith, and afterwards at St. Mungo's College, Glasgow, and Glasgow University.

It was in 1901, when he was assistant to Dr. Gemmell of the Zoological Department of the University, that he entered upon what was to be his life's work. He became at that time a visiting lecturer on the staff of Dundas Vale College, when that college was the old "Normal" of the Established Church of Scotland, and he served in the training of teachers throughout all its changes in administration until September 1945, when he left the Training College, Jordanhill. He might have retired earlier, but because of his outstanding ability as a lecturer he was asked to continue in harness during the hard years of the war. Although this extra spell of work must have put a severe strain upon his strength, he performed his duties with his accustomed zeal and with great success.

Mr. Connell was a field naturalist of outstanding reputation and a distinguished biologist who for four decades, through his work in the training centre, exercised a far reaching and pervasive influence on the study of Nature in our Scottish schools. He was a born teacher and a cultured and finished lecturer. His students were his first consideration, nor did he ever spare himself in helping them over their difficulties. Many to-day have cause to be grateful for his interest in their careers and for the sound advice he gave so readily and so ungrudgingly. Possessed of a happy sense of humour, he had the gift of imparting good cheer wherever he went.

Before the war, Mr. Connell was much sought after as a Lecturer, giving many courses of lectures, chiefly on Animal Studies in connection with the Adult Education Movement.

Mr. Connell joined the Natural History Society of Glasgow on 25th February, 1908. He was the Society's Representa-

tive to the Committee of the Scottish Marine Biological Association from 1908 till 1945. He was greatly attached to the Millport Station, and in his day did valuable work there.

Mr. Connell was President of the Andersonian Naturalists' Society in 1915 and 1916. At the time of his death he was Vice-President of this Society, and as recently as Monday, 3rd June, he presided at a meeting of the Council—eight days before his passing.

DONALD PATTON.



# INDEX OF PERSONS

|                              |                            |                                |                      |
|------------------------------|----------------------------|--------------------------------|----------------------|
| Absalom, Dr. R. G. ....      | 25                         | Craig, J. C. D. ....           | 22, 25, 36, 42, 65   |
| Aird, R. ....                | 90                         | 83, 84, 87, 92, 124            |                      |
| Aitken, W. H. ....           | 90                         | Crawford, J. S. ....           | 92                   |
| Anderson, I. T. ....         | 84, 90                     | Cromwell, Dr. B. T. ....       | 92                   |
| Anderson, J. ....            | 22, 83, 84, 90, 124        | Cross, H. ....                 | 84                   |
| 125                          |                            | Crow, M. F. ....               | 109                  |
| Anderson, R. ....            | 24                         | Dallas, W. ....                | 92                   |
| Bain, J. G. ....             | 90                         | Davidson, Dr. W. C. ....       | 92                   |
| Balfour-Brown, Prof. F. .... | 57                         | Dewar, D. ....                 | 23, 83, 92, 124, 129 |
| 91, 112                      |                            | 133                            |                      |
| Ballantine, A. ....          | 91                         | Dick, A. F. ....               | 92                   |
| Barr, Rev. R. ....           | 91                         | Dickson, D. S. ....            | 92                   |
| Bartholomew, J. ....         | 91                         | Doyle, G. ....                 | 92                   |
| Bennett, J. ....             | 26, 91                     | Drewell, C. H. ....            | 24, 25, 26, 92       |
| Berry, Dr. J. ....           | 25, 91, 130                | Druce, G. C. ....              | 8                    |
| Bertram, E. D. ....          | 84, 91                     | Duke, C. H. ....               | 87, 92               |
| Biggar, J. ....              | 91, 125                    | Dumfries, Earl of ....         | 111                  |
| Bissett, A. M. ....          | 26, 91                     | Dunlop, Dr. J. ....            | 92                   |
| Black, M. M. ....            | 91                         | Dunnachie, A. D. H. ....       | 93                   |
| Bower, Prof. F. O. ....      | 90                         | Dunsmore, J. ....              | 81                   |
| Bowie, D. C. ....            | 91                         | Elinhirst, R. ....             | 71, 72, 93           |
| Boyd, J. ....                | 26, 30, 32, 67, 83, 84, 87 | Emery, G. A. ....              | 93                   |
| 88, 91, 116, 124, 130        |                            | Ewing, E. ....                 | 93                   |
| Boyes, J. ....               | 91                         | Ewing, P. ....                 | 68                   |
| Braid, Prof. K. W. ....      | 91                         | Ewing, R. ....                 | 90                   |
| Brock, E. R. ....            | 87, 91                     | Ferguson, T. ....              | 93                   |
| Brown, H. A. ....            | 128                        | Fergusson, A. ....             | 35, 57, 93           |
| Brown, J. I. ....            | 91                         | Fergusson, A. G. ....          | 93                   |
| Brown, R. ....               | 91                         | Fernie, M. ....                | 93                   |
| Brown, Sir T. ....           | 37                         | Fethney, J. R. ....            | 93                   |
| Bryce, Prof. T. H. ....      | 129, 132                   | Fisher, J. ....                | 39                   |
| Buchanan, D. ....            | 91                         | Flint, Dr. E. A. ....          | 109                  |
| Burman, A. ....              | 91                         | Flower, W. V. ....             | 87, 93               |
| Burman, H. ....              | 91                         | Forbes, E. J. ....             | 93                   |
| Byrne, D. F. ....            | 109                        | Forrest, A. ....               | 89, 93               |
| Cameron, E. B. ....          | 91                         | Forrest, J. ....               | 93                   |
| Cameron, Dr. J. I. ....      | 22, 24, 25                 | Fraser, A. R. ....             | 93                   |
| 37, 42, 83, 85, 91, 111, 124 |                            | Frew, J. ....                  | 25, 93               |
| 125                          |                            | Gardiner, W. G. ....           | 90                   |
| Campbell, A. F. ....         | 91                         | Gardner, J. A. ....            | 93                   |
| Campbell, R. ....            | 91                         | Galloway, T. ....              | 84, 93               |
| Campbell, R. S. F. ....      | 91                         | Gibb, A. ....                  | 93                   |
| Campbell, W. C. ....         | 91                         | Gilmour, Dr. C. C. ....        | 90                   |
| Cannon, D. E. H. ....        | 24                         | Gladstone, Sir H. S. ....      | 93                   |
| Cannon, W. J. ....           | 22, 36, 51, 83, 85         | Glegg, D. B. ....              | 93                   |
| 86, 92, 122, 124, 131, 135   |                            | Glen, M. ....                  | 26, 93, 125, 128     |
| Carmichael, C. P. ....       | 92                         | Glen, Mrs. M. ....             | 23, 87, 93, 128      |
| Carrie, W. W. ....           | 92                         | Gordon, T. H. M. ....          | 22, 34, 54, 83       |
| Clegg, D. B. ....            | 25                         | 85, 86, 93, 124                |                      |
| Cochran, K. ....             | 92                         | Graham, J. C. ....             | 22, 24, 81, 83, 93,  |
| Colvin, T. S. ....           | 26, 92                     | 108, 124, 128                  |                      |
| Conacher, H. R. J. ....      | 85                         | Graham, J. D. P. ....          | 94                   |
| Connell, J. G. ....          | 23, 66, 83, 84, 88         | Graham Kerr, Prof. Sir J. .... | 90                   |
| 89, 92, 124, 125, 126, 129   |                            | 104, 129                       |                      |
| 136                          |                            | Gray, R. ....                  | 22, 23, 83, 94, 124  |
| Conway, Dr. E. ....          | 89, 109                    | Gray, Mrs. R. ....             | 94                   |
| Cozens, K. ....              | 92                         | Gronbech, N. H. C. ....        | 94                   |
| Cornwall, I. ....            | 25, 92                     | Haddow, Dr. A. ....            | 110                  |



|                            |                                 |                            |                         |
|----------------------------|---------------------------------|----------------------------|-------------------------|
| Hamilton, J. ....          | 125                             | Mackay, J. M. ....         | 26, 96                  |
| Harris, Prof. J. E. ....   | 109                             | MacKechnie, D. A. ....     | 24, 96                  |
| Hart, J. Y. ....           | 84, 94                          | MacKechnie, R. ....        | 96                      |
| Hartley, W. G. ....        | 94                              | McKeith, T. T. ....        | 96, 122                 |
| Hawthorn, J. W. ....       | 94                              | McKenzie, M. A. ....       | 96                      |
| Headley, E. ....           | 94                              | McKinna, M. E. T. ....     | 83, 84, 87              |
| Henderson, Col. ....       | 25                              |                            | 96, 124                 |
| Henderson, T. B. ....      | 26                              | Maclaurin, A. M. ....      | 26, 96                  |
| Henderson, J. S. ....      | 65                              | Maclean, A. C. ....        | 96                      |
| Hindle, Prof. E. ....      | 22                              | Maclean, G. ....           | 22, 33, 83, 96, 124     |
| Hodge, R. ....             | 22, 83, 94, 108, 124            |                            | 125                     |
|                            | 128                             | McLean, R. ....            | 23, 96                  |
| Hogg, J. C. ....           | 27, 94                          | McLean, W. ....            | 24, 36, 82, 83, 96      |
| Holloway, L. E. ....       | 36, 94, 122                     |                            | 124, 131, 134           |
| Hood, R. W. ....           | 94                              | McLellan, J. ....          | 96                      |
| Hopkins, G. M. ....        | 37                              | McLeod, J. ....            | 111                     |
| Hopkins, N. ....           | 34 89, 94, 134                  | McNeill, C. ....           | 96                      |
| Hunter, J. G. ....         | 94                              | McPhail, J. ....           | 96                      |
| Hunter, J. ....            | 94                              | MacQueen, J. ....          | 96                      |
| Jack, J. ....              | 8                               | Macrae, J. G. ....         | 89, 96                  |
| Jack, Prof. J. R. ....     | 90                              | MacTavish, J. B. ....      | 96                      |
| Jamieson, W. ....          | 22, 83, 94, 124                 | McVean, D. A. ....         | 96                      |
|                            | 129, 133                        | McVean, D. R. ....         | 26, 96                  |
| Jepps, M. W. ....          | 94                              | Main, Mrs. ....            | 96                      |
| Johnstone, R. H. ....      | 22, 26, 59, 65                  | Marshall, Dr. S. M. ....   | 72, 109                 |
|                            | 74, 83, 88, 94, 108, 124, 133   | Martin, T. ....            | 96                      |
| Keaney, T. ....            | 94, 126                         | Maxwell, J. H. ....        | 96, 126, 127            |
| Kerr, R. ....              | 94                              | Meikle, A. A. ....         | 22, 83, 84, 97, 110     |
| King, Prof. L. A. L. ....  | 22, 23, 25                      |                            | 123-5, 127              |
|                            | 29, 30, 84, 94                  | Millar, K. J. ....         | 97                      |
| Kirkwood, J. ....          | 36, 82, 95, 122                 | Millar, M. ....            | 97                      |
| Laidlaw, Dr. W. B. R. .... | 95                              | Miller, Dr. J. B. ....     | 97                      |
| Lander, T. ....            | 95                              | Milne, Dr. J. F. ....      | 97                      |
| Lee, J. R. ....            | 1, 22, 23, 24, 26, 28,          | Milroy, W. ....            | 97                      |
|                            | 29, 43, 69, 83, 85, 88, 95, 124 | Mirrlees, W. ....          | 97                      |
|                            | 127, 128, 130                   | Morgan, C. J. E. ....      | 97                      |
| Leitch, A. ....            | 25, 95                          | Morgan, W. ....            | 97                      |
| Leitch, Dr. D. ....        | 127-8                           | Mowat, Dr. G. T. ....      | 97                      |
| Leslie, J. D. ....         | 22, 42, 66, 74, 83-9            | Murdoch, A. ....           | 97                      |
|                            | 95, 125, 128                    | Nicol, J. S. ....          | 97                      |
| Liddell, G. ....           | 95                              | Nicol, Mrs. J. S. ....     | 97                      |
| Lindsay, A. R. ....        | 87, 95                          | Nisbet, T. ....            | 97                      |
| Lindsay, Dr. J. ....       | 90                              | Orr, Dr. A. P. ....        | 27, 72, 109             |
| Lissman, Dr. H. W. ....    | 109                             | Osborne, H. ....           | 22, 83, 87, 97, 124     |
| Ligat, D. ....             | 90                              | Parkinson, S. ....         | 97                      |
| Lloyd, Dr. B. ....         | 95, 109                         | Parlane, J. ....           | 97                      |
| Lothian, D. M. ....        | 81, 89, 95                      | Paterson, S. ....          | 97                      |
| Lothian, J. P. ....        | 95                              | Paton, R. ....             | 122                     |
| Lunam, Geo. ....           | 95                              | Patton, A. D. ....         | 24, 97                  |
| MacAllister, G. W. ....    | 95                              | Patton, Dr. D. ....        | 22, 65, 83, 97, 104     |
| McCallum, A. ....          | 95                              |                            | 112, 124, 137           |
| McClelland, S. ....        | 21, 88, 95                      | Pearson, A. A. ....        | 60                      |
| McColm, M. G. ....         | 129                             | Petrie, W. ....            | 25, 26, 97              |
| McCrindle, J. ....         | 66                              | Pettigrew, W. M. ....      | 23, 97, 125             |
| McCutcheon, J. ....        | 90                              | Phillips, Major G. W. .... | 97                      |
| McCutcheon, W. ....        | 95                              | Pirret, J. ....            | 97                      |
| McFarlane, B. ....         | 96                              | Poynting, L. F. ....       | 98                      |
| McFarlane, C. D. ....      | 26, 96                          | Prasher, R. ....           | 22, 26, 31, 43, 68      |
| McFarlane, Mrs. E. ....    | 26, 96                          |                            | 72, 83, 87, 88, 97, 121 |
| Macintyre, A. ....         | 96                              | Pyefinch, K. A. ....       | 110                     |
| McIntyre, W. ....          | 22, 83, 96, 124                 | Rae, G. M. ....            | 98                      |

|                              |                        |                           |                  |
|------------------------------|------------------------|---------------------------|------------------|
| Rappa, W. A. ....            | 98                     | Stewart, J. ....          | 99               |
| Rattray, G. ....             | 33, 34                 | Stewart, J. A. ....       | 99               |
| Readman, W. A. ....          | 98                     | Stollery, E. W. R. ....   | 36, 82, 99       |
| Rennie, W. ....              | 25, 36, 81, 82, 87, 98 | 122, 124, 125             |                  |
| 101, 128                     |                        | Stollery, Mrs. M. T. .... | 99               |
| Renouf, Prof. L. P. W. ....  | 98                     | Sword, W. C. ....         | 99               |
| Richardson, J. ....          | 98, 122                | Syme, V. M. ....          | 99               |
| Roberts, T. D. M. ....       | 109                    | Thompson, H. V. ....      | 110              |
| Robertson, I. ....           | 98                     | Thomson, A. L. ....       | 99               |
| Robertson, J. ....           | 111                    | Thomson, I. P. ....       | 99               |
| Robertson, J. M. ....        | 98                     | Thomson, J. C. ....       | 99               |
| Robertson, T. ....           | 19, 23, 25, 26, 28     | Thomson, S. ....          | 25               |
| 35, 46, 63, 68, 72, 83-5, 87 |                        | Vernon, Rev. E. T. ....   | 99               |
| 98, 105, 122, 124, 128       |                        | Wallace, J. M. ....       | 99               |
| Ross, H. ....                | 98                     | Wallace, W. S. ....       | 99               |
| Russell Hunter, W. ....      | 109                    | Walton, Prof. J. ....     | 24, 83, 86, 99   |
| Russell, T. T. ....          | 98                     | 111, 124, 125, 126, 127   |                  |
| Russell, W. ....             | 23, 34, 81, 83, 98     | 130-2                     |                  |
| 113, 124, 125                |                        | Walton, J. ....           | 110              |
| Scase, R. P. ....            | 98                     | Watson, H. C. ....        | 1, 2, 3          |
| Scobie, J. ....              | 98                     | Watson, J. H. ....        | 99               |
| Scott, M. G. ....            | 87, 98                 | Watson, J. S. ....        | 99               |
| Seaton, J. ....              | 87, 98                 | Watson-Baker, W. E. ....  | 99               |
| Sharpe, Dr. J. S. ....       | 82                     | Watt, J. A. ....          | 26, 99           |
| Shanks, A. ....              | 87, 98                 | Weir, J., Junr. ....      | 131              |
| Shearer, L. G. ....          | 84, 98                 | Weir, W. M. ....          | 100              |
| Shepherd, D. A. ....         | 98                     | Welsh, A. ....            | 100              |
| Sime, D. ....                | 98                     | White, R. M. ....         | 100              |
| Simpson, E. ....             | 127                    | Whiteford, T. H. B. ....  | 86               |
| Slack, Dr. H. ....           | 131                    | Whyte, R. F. ....         | 100              |
| Smith, Lieut. F. W. ....     | 99                     | Williams-Ellis, S. ....   | 109              |
| Smith, Jas. ....             | 24, 99                 | Wilson, W. S. ....        | 26, 99           |
| Smith, Jno. ....             | 67, 72                 | Wood, J. R. ....          | 23, 83, 100, 124 |
| Smith, J. T. ....            | 22, 99                 | Woodger, A. G. ....       | 100              |
| Spittal, M. M. ....          | 99                     | Woodland, P. ....         | 22, 83, 100, 124 |
| Stephen, Dr. A. C. ....      | 109                    | Wordie, W. ....           | 90               |
| Stevenson, Rev. J. ....      | 60, 62                 | Wotherspoon, A. ....      | 100, 126         |
| Stewart, D. M. ....          | 99                     | Yonge, Prof. C. M. ....   | 87, 100, 109     |
| Stewart, Mrs. D. M. ....     | 99                     | Young, G. A. ....         | 100              |
| Stewart, E. J. A. ....       | 23, 83, 99, 124        | Yuill, A. ....            | 100              |

## NAME INDEX

|                                   |    |                              |         |
|-----------------------------------|----|------------------------------|---------|
| Acer Pseudoplatanus ....          | 11 | Allium vineale ....          | 67, 115 |
| Achillea Ptarmica ....            | 13 | Alopecurus geniculatus ....  | 17      |
| Achillea Millefolium ....         | 14 | Alopecurus pratensis ....    | 17      |
| Adoxa moschatellina ....          | 8  | Anagallis arvensis ....      | 33      |
| Aegopodium Podagraria ....        | 13 | Anagallis tenella ....       | 116     |
| Aesculus Hippocastanum ....       | 11 | Anemone nemerosa ....        | 9       |
| Agrimonia Eupatoria . 32, 74, 114 |    | Andromede polifolia ....     | 7, 14   |
| Agropyrum repens ....             | 18 | Amara ovata ....             | 82      |
| Agrostis alba ....                | 17 | Amphydasys betularius ....   | 14      |
| Agrostis canina ....              | 17 | Angelica sylvestris ....     | 14      |
| Agrostis vulgaris ....            | 17 | Apium inundatum ....         | 28      |
| Aira praecox ....                 | 17 | Aplozia cordifolia ....      | 71      |
| Ajuga reptans ....                | 16 | Arctium minus ....           | 14      |
| Alchemilla arvensis ....          | 75 | Arenaria serpyllifolia ....  | 10      |
| Alchemilla vulgaris ....          | 12 | Arenaria trinerva ....       | 10      |
| Alisma plantago ....              | 16 | Arrhenatherum avenaceum..... | 17      |
| Alnus glutinosa ....              | 11 | Artemisia vulgaris ....      | 14      |

|                                       |                |  |               |
|---------------------------------------|----------------|--|---------------|
| Arum maculatum .....                  | 16, 118        | Chrysanthemum Leucanthemum .....           | 14            |
| Asenum striatum .....                 | 82             | Chrysanthemum Parthenium .....             | 14            |
| Asperula odorata .....                | 8              | Chrysanthemum segetum .....                | 14            |
| Asplenium Adiantum-nigrum .....       | 18             | Chrysosplenium oppositifolium .....        | 12            |
| Asplenium Ruta-muraria .....          | 18             | Chrysosplenium alternifolium .....         | 76            |
| Aster longifolius .....               | 8, 13          | Cicuta virosa .....                        | 30, 73, 120   |
| Astrantia major .....                 | 13             | Cinclus cinclus gularis .....              | 69            |
| Athyrium Filix-foemina .....          | 18, 29         | Circaea alpina .....                       | 120           |
| 30                                    |                | Circaea lutetiana .....                    | 13            |
| Atriplex patula .....                 | 10             | Claytonia perfoliata .....                 | 115           |
| Barbarea vulgaris .....               | 9              | Claytonia sibirica .....                   | 8, 10, 28, 77 |
| Bartsia Odontites .....               | 15             | 119  |               |
| Bellis perennis .....                 | 13             | Clavaria stricta .....                     | 59, 61        |
| Berberis vulgaris .....               | 9              | Climacium dendroides .....                 | 32            |
| Betula alba .....                     | 11             | Clytocybe cartilaginea .....               | 59            |
| Betula pubescens .....                | 11             | Clytocybe pseudoconglobatus .....          | 59            |
| Blaps mucronata .....                 | 35             | 60   |               |
| Blechnum boreale .....                | 18             | Collybia lencomyosotis .....               | 59            |
| Boletus luteus .....                  | 75             | Comarum palustre .....                     | 12, 30        |
| Botrychium Lunaria .....              | 18             | Conium maculatum .....                     | 74            |
| Brassica Sinapis .....                | 9              | Convolvulus arvensis .....                 | 8, 15, 79     |
| Bromus asper .....                    | 18             | Coprinus radians .....                     | 68            |
| Bromus mollis .....                   | 18             | Corydalis claviculata .....                | 9             |
| Calamintha clinopodium .....          | 74             | Corylus Avellana .....                     | 11            |
| Callitriche verna .....               | 11             | Crataegus Oxycantha .....                  | 12            |
| Caltha pelustris .....                | 9              | Crepis paludosa .....                      | 14            |
| Calystegia sepium .....               | 8              | Crepis virens .....                        | 14            |
| Camelina sativa, var foetida .....    | 9              | Crithmum maritimum .....                   | 67, 86        |
| Capsella bursa-pastoris .....         | 9              | Cynosurus cristatus .....                  | 17            |
| Cardamine amara .....                 | 9              | Cryptopteris fragilis .....                | 18            |
| Cardamine hirsuta .....               | 9              | Dactylis glomerata .....                   | 17            |
| Cardamine hirsuta var sylvatica ..... | 9              | Dancus Carota .....                        | 67            |
| Cardamine pratensis .....             | 9              | Deschampsia caespitosa .....               | 17            |
| Carex acuta .....                     | 30             | Deschampsia flexuosa .....                 | 17            |
| Carex ampullacea .....                | 17, 30         | Dicranura vinula .....                     | 34            |
| Carex binervis .....                  | 17             | Digitalis purpurea .....                   | 15, 114       |
| Carex canescens .....                 | 17, 30         | Draparnaldia sp. ....                      | 76            |
| Carex caryophyllea .....              | 17             | Drosera anglica .....                      | 13            |
| Carex disticha .....                  | 119            | Drosera rotundifolia .....                 | 13            |
| Carex echinata .....                  | 30             | Dryocoetes antographus .....               | 13            |
| Carex glauca .....                    | 17             | Dryopteris dilatata .....                  | 18, 29        |
| Carex leporina .....                  | 17, 30         | Dryopteris dilatata, var. collina .....    | 18            |
| Carex Oederi .....                    | 30             | Dryopteris dilatata, var. glandulosa ..... | 18            |
| Carex panicea .....                   | 17, 30         | Dryopteris Filix-mas .....                 | 18, 29        |
| Carex paniculata .....                | 30             | Dryopteris Felix-mas, var. Borreri .....   | 18            |
| Carex remota .....                    | 17             | Dryopteris Oreopteris .....                | 18            |
| Carex sylvatica .....                 | 17             | Echinosperrum Lappula .....                | 15            |
| Carex terstinscule .....              | 30             | Echium vulgare .....                       | 73            |
| Carex vulgaris .....                  | 17, 30         | Edmondia punctatella .....                 | 52            |
| Castanea sativa .....                 | 11             | Eleocharis palustris .....                 | 16, 30        |
| Carpinus Betulus .....                | 11             | Empetrum nigrum .....                      | 11            |
| Centaurea nigra .....                 | 14             | Epilobium angustifolium .....              | 13, 29        |
| Cerastium glomeratum .....            | 10             | Epilobium hirsutum .....                   | 13            |
| Cerastium triviale .....              | 10             | Epilobium montanum .....                   | 13            |
| Ceterach officinarium .....           | 28, 67         | Epilobium nummularifolium .....            | 8             |
| 119                                   |                | 13, 30, 76                                 |               |
| Cheiranthus Cheiri .....              | 74, 118        |  |               |
| Chelidonium majus .....               | 9, 74, 86, 118 |  |               |
| Chenopodium album, viride ..          | 10             |  |               |



|  |                |                                     |             |
|--|----------------|-------------------------------------|-------------|
| <i>Epilobium palustre</i> .....                      | 13             | <i>Hrygrophorus abrusseus</i> ..... | 59, 60      |
| <i>Epilobium parvifolium</i> .....                   | 13             | <i>Hypericum dubium</i> .....       | 8, 10       |
| <i>Epilobium tetragonum</i> .....                    | 8, 13          | <i>Hypericum humifusum</i> .....    | 114         |
| <i>Erica cinerea</i> .....                           | 14             | <i>Hypericum perforatum</i> .....   | 10          |
| <i>Erica tetralix</i> .....                          | 14             | <i>Hypericum pulchrum</i> .....     | 10          |
| <i>Eriophorum angustifolium</i> .....                | 17             | <i>Hypericum tetrapterum</i> .....  | 10, 114     |
| <i>Eriophorum vaginatum</i> .....                    | 17             | <i>Hypochoeris radicata</i> .....   | 14          |
| <i>Erodium cicutarium</i> .....                      | 77             | <i>Ilex aquifolium</i> .....        | 11          |
| <i>Erysimum orientale</i> .....                      | 9              | <i>Iris pseudoacorus</i> .....      | 16, 30      |
| <i>Erythraea centaurium</i> .....                    | 79             | <i>Jasione montana</i> .....        | 8, 14, 86   |
| <i>Euphorbia helioscopia</i> .....                   | 11             | <i>Juncus acutiflorus</i> .....     | 16          |
| <i>Euphrasia officinalis</i> .....                   | 15             | <i>Juncus bufonius</i> .....        | 16          |
| <i>Eurhynchium Stokesii</i> .....                    | 68             | <i>Juncus conglomeratus</i> .....   | 16          |
| <i>Fagus sylvatica</i> .....                         | 11             | <i>Juncus effusus</i> .....         | 16          |
| <i>Festuca elatior</i> .....                         | 18             | <i>Juncus Gerardi</i> .....         | 116         |
| <i>Festuca gigantea</i> .....                        | 18             | <i>Juncus glaucus</i> .....         | 79          |
| <i>Festuca ovina</i> .....                           | 17             | <i>Juncus lamprocarpus</i> .....    | 16          |
| <i>Festuca ovina</i> var. <i>major</i> .....         | 17             | <i>Juncus maritima</i> .....        | 116         |
| <i>Festuca pratensis</i> .....                       | 8, 18          | <i>Juncus squarrosus</i> .....      | 16          |
| <i>Fragaria elatior</i> .....                        | 8, 12          | <i>Juncus supinus</i> .....         | 16          |
| <i>Fragaria vesca</i> .....                          | 12             | <i>Juncus tenuis</i> .....          | 16          |
| <i>Fraxinus excelsior</i> .....                      | 15             | <i>Lactuca muralis</i> .....        | 77, 86, 120 |
| <i>Gagea lutea</i> .....                             | 32             | <i>Lamium album</i> .....           | 16          |
| <i>Galeopsis speciosa</i> .....                      | 16             | <i>Lamium maculatum</i> .....       | 120         |
| <i>Galeopsis tetrahit</i> .....                      | 16             | <i>Lamium purpureum</i> .....       | 16          |
| <i>Galium aparina</i> .....                          | 13             | <i>Lapsana communis</i> .....       | 14, 86      |
| <i>Galium cruciatum</i> .....                        | 73             | <i>Larix europaea</i> .....         | 18          |
| <i>Galium palustre</i> .....                         | 86             | <i>Lathyrus macrorrhizus</i> .....  | 12          |
| <i>Galium palustre</i> var. <i>Witheringii</i> ..... | 13             | <i>Lathyrus pratensis</i> .....     | 12          |
| <i>Galium saxatile</i> .....                         | 13             | <i>Latona setifera</i> .....        | 123         |
| <i>Galium verum</i> .....                            | 13             | <i>Leander squilla</i> .....        | 110         |
| <i>Galium uliginosum</i> , .....                     | 33, 86, 120    | <i>Lemna minor</i> .....            | 16          |
| <i>Geranium dissectum</i> .....                      | 11             | <i>Lemna trisulcea</i> .....        | 16          |
| <i>Geranium phaeum</i> .....                         | 76             | <i>Leontodon autumnalis</i> .....   | 14          |
| <i>Geranium Robertianum</i> .....                    | 11, 114        | <i>Leontodon hispidus</i> .....     | 119         |
| <i>Geranium sanguineum</i> .....                     | 115            | <i>Lepidium Smithii</i> .....       | 77, 120     |
| <i>Geum urbanum</i> .....                            | 12             | <i>Lepiota acutesquamosa</i> .....  | 61          |
| <i>Geum rivale</i> .....                             | 12             | <i>Ligusticum scoticum</i> .....    | 67, 115     |
| <i>Gigartina</i> sp. ....                            | 66, 109        | <i>Ligustrum vulgare</i> .....      | 15          |
| <i>Glyceria aquatica</i> .....                       | 8, 17, 79, 119 | <i>Linaria cymbalaria</i> .....     | 15          |
| <i>Glyceria fluitans</i> .....                       | 17             | <i>Linaria vulgaris</i> .....       | 15          |
| <i>Gnaphalium sylvaticum</i> .....                   | 13, 74         | <i>Linum catharticum</i> .....      | 10, 86      |
| <i>Gnaphalium uliginosum</i> .....                   | 13             | <i>Listera ovata</i> .....          | 16, 73      |
| <i>Gymnadenia conopsea</i> .....                     | 16             | <i>Littorella uniflora</i> .....    | 28          |
| <i>Habernaria chlorantha</i> .....                   | 16             | <i>Lolium perenne</i> .....         | 18          |
| <i>Hedera helix</i> .....                            | 13             | <i>Lonicera periclymenum</i> .....  | 13          |
| <i>Heracleum spondylium</i> .....                    | 13             | <i>Lophocolea cuspidata</i> .....   | 66          |
| <i>Heterocladium heteropterum</i> .....              | 68             | <i>Lotus corniculatus</i> .....     | 11          |
| <i>Hippophae rhamnoides</i> .....                    | 115            | <i>Lotus major</i> .....            | 11          |
| <i>Hippuris vulgaris</i> .....                       | 13, 73, 79     | <i>Luzula campestris</i> .....      | 16          |
| <i>Hieracium auranticum</i> .....                    | 14             | <i>Luzula pilosa</i> .....          | 16          |
| <i>Hieracium auratum</i> .....                       | 14             | <i>Luzula sylvatica</i> .....       | 16          |
| <i>Hieracium boreale</i> .....                       | 14             | <i>Lychnis diurna</i> .....         | 10, 29      |
| <i>Hieracium pilosella</i> .....                     | 14             | <i>Lychnis Flos-cuculi</i> .....    | 10          |
| <i>Hieracium vulgatum</i> .....                      | 14             | <i>Lychnis vespertina</i> .....     | 10          |
| <i>Holcus lanatus</i> .....                          | 17             | <i>Lycopus europaeus</i> .....      | 16, 114     |
| <i>Holcus mollis</i> .....                           | 17             | <i>Lysimachia nemorum</i> .....     | 15, 28      |
| <i>Holopodium gibberum</i> .....                     | 123            | <i>Lysimachia thyrsiflora</i> ..... | 8, 15       |
| <i>Homalia trichomanoides</i> .....                  | 68             | <i>Lythrum salicaria</i> .....      | 12, 120     |
| <i>Humulus lupulinus</i> .....                       | 11, 28, 119    | <i>Malva moschata</i> .....         | 78          |
|  |                | <i>Malva sylvestris</i> .....       | 78          |



|   |           |                                |            |
|---|-----------|--------------------------------|------------|
| Marasmius orcales .....                     | 116       | Picea excelsa .....            | 18         |
| Marasmius orcadoides .....                  | 59, 60    | Pimpinella saxifraga .....     | 67         |
| Matricaria inodora .....                    | 14        | Pinus sylvestris .....         | 8, 18      |
| Matricaria suaveolens .....                 | 14        | Planorbis laevis .....         | 123        |
| Meconopsis cambrica .....                   | 9, 119    | Plantago lanceolata .....      | 15         |
| Medicago lupulina .....                     | 8, 73     | Plantago major .....           | 15         |
| Melampyrum pratense .....                   | 15        | Poa annua .....                | 17         |
| Melica uniflora .....                       | 77        | Poa chaixi .....               | 68         |
| Melilotus alba .....                        | 79        | Poa nemoralis .....            | 17         |
| Melilotus altissima .....                   | 80        | Poa pratensis .....            | 17         |
| Mentha alopecuroides .....                  | 15        | Poa trivialis .....            | 17         |
| Mentha aquatica .....                       | 15        | Polygala vulgaris .....        | 11         |
| Mentha arvensis .....                       | 15        | Polygonum amphibium .....      | 10         |
| Mentha sativa .....                         | 15        | Polygonum aviculare .....      | 10         |
| Menyanthes trifoliata .....                 | 15, 30    | Polygonum bistorta .....       | 10         |
| Mercurialis perennis .....                  | 11        | Polygonum convolvulus .....    | 10         |
| Milium effusum .....                        | 8, 17, 80 | Polygonum cuspidatum .....     | 10         |
| Mimulus luteus .....                        | 15, 30    | Polygonum hydropiper .....     | 10         |
| Molinia caerulea .....                      | 17        | Polygonum persicaria .....     | 10         |
| Montia fontana .....                        | 10        | Polypodium vulgare .....       | 18         |
| Motacilla c. cinerea .....                  | 69        | Polyporus stipticus .....      | 59         |
| Mycena inclinata .....                      | 59        | Polyporus trumalis .....       | 68         |
| Myosotis arvensis .....                     | 15        | Polystictus abietinus .....    | 61         |
| Myosotis caespitosa .....                   | 15, 30    | Populus nigra .....            | 11         |
| Myosotis palustris .....                    | 15        | Populus tremula .....          | 11, 30     |
| Myosotis palustris var.<br>strigulosa ..... | 15        | Potamogeton natans .....       | 16         |
| Myosotis repens .....                       | 15        | Potentilla anserina .....      | 12         |
| Myosotis versicolor .....                   | 15        | Potentilla fragariastrum ..... | 12         |
| Myrica gale .....                           | 14        | Potentilla procumbens .....    | 12         |
| Myriophyllum spicatum .....                 | 13        | Potentilla tormentilla .....   | 12         |
| Myrrhis odorata .....                       | 13        | Primula vulgaris .....         | 14         |
| Nardus stricta .....                        | 18        | Prunella vulgaris .....        | 16         |
| Nasturtium officinale .....                 | 9, 73     | Prunus avium .....             | 12         |
| Nasturtium sylvestre .....                  | 8, 9      | Prunus padus .....             | 12         |
| Nepeta glechoma .....                       | 16        | Prunus spinosa .....           | 12         |
| Niptus hololeucus .....                     | 82        | Psalliotia campestris .....    | 116        |
| Nowellia curvifolia .....                   | 68        | Psilocybe uda .....            | 59         |
| Nuphar luteum .....                         | 9         | Pteridium aquilinum .....      | 18, 30     |
| Ocypus olens .....                          | 81        | Pulmonaria officinalis .....   | 8, 15      |
| Oenanthe lachenalii .....                   | 116       | Pyrola minor .....             | 119        |
| Ophioglossum vulgatum .....                 | 18        | Pyrus aria .....               | 120        |
| Orchis mascula .....                        | 77        | Pyrus aucuparia .....          | 12         |
| Origanum vulgare .....                      | 74        | Quedius fumatus .....          | 35         |
| Ornithopus perpusillus .....                | 11, 79    | Quedius lammianus .....        | 35         |
| Oxalis acetosella .....                     | 11        | Quedius lateralis .....        | 35         |
| Oxycoccus palustris .....                   | 14, 119   | Quedius pallipez .....         | 35         |
| Ozonium auricomus .....                     | 68        | Quercus robur .....            | 11         |
| Pecten maximum .....                        | 72        | Radiola milligrana .....       | 86         |
| Pedicularis palustris .....                 | 15        | Radulum molare .....           | 59, 60     |
| Pedicularis sylvatica .....                 | 15        | Ranunculus acris .....         | 9          |
| Petasites albus .....                       | 8, 14     | Ranunculus bulbosus .....      | 77         |
| Petasites fragrans .....                    | 77        | Ranunculus ficaria .....       | 8, 86      |
| Petasites vulgaris .....                    | 8         | Ranunculus flammula .....      | 9          |
| Peucedanum ostruthium .....                 | 13, 76    | Ranunculus hederaceus .....    | 33         |
| Peziza rapula .....                         | 68        | Ranunculus lenormandi .....    | 9, 76      |
| Phagopteris dryopteris .....                | 18        | Ranunculus repens .....        | 9          |
| Phagopteris polypodoides .....              | 18        | Raphanus raphanistrum .....    | 10         |
| Phalaris arundinacea .....                  | 17        | Reseda lutea .....             | 8, 10, 119 |
| Phleum pratense .....                       | 17        | Rhinanthus crista-galli .....  | 15         |
| Phragmites communis .....                   | 17, 79    | Rhododendron ponticum .....    | 14         |
|   |           | Ribes alpinum .....            | 12, 119    |

|                                  |             |                                     |                 |
|----------------------------------|-------------|-------------------------------------|-----------------|
| Ribes grossularia .....          | 13          | Sedum reflexium .....               | 74              |
| Ribes nigrum .....               | 8, 12       | Sedum telephium .....               | 12              |
| Rosa canina .....                | 12          | Sedum villosum .....                | 119             |
| Rosa canina v. caesia .....      | 12          | Senecio aquaticus .....             | 14, 30          |
| Rosa canina v. dumalis .....     | 12          | Senecio Jacobaea .....              | 14              |
| Rosa canina v. dumetorum .....   | 12          | Senecio viscosus .....              | 14, 75          |
| Rosa canina v. glauca .....      | 12          | Senecio vulgaris .....              | 14              |
| Rosa canina v. suberistata ..... | 12          | Sida crystallina .....              | 123             |
| Rosa lutetiana .....             | 12          | Silene inflata .....                | 8, 10, 75       |
| Rosa mollissima .....            | 12          | Sisymbrium altissimum .....         | 9, 79           |
| Rosa spinosissima .....          | 77          | Sisymbrium alliaria .....           | 9               |
| Rosa tomentosa .....             | 12, 114     | Sisymbrium officinale .....         | 9               |
| Rubus congelifolius .....        | 12          | Sisymbrium thalianum .....          | 77              |
| Rubus fissus .....               | 12          | Sium erectum .....                  | 28, 73, 79, 119 |
| Rubus Idaeus .....               | 12          | 120                                 |                 |
| Rubus infestans .....            | 12          | Smerinthus populi .....             | 81              |
| Rubus memorialis .....           | 12          | Smyrniun olusatrum .....            | 78              |
| Rubus plicatus .....             | 12, 120     | Solanum Dulcamara .....             | 15              |
| Rubus Radula .....               | 12          | Solidago Virgaurea .....            | 13              |
| Rubus Schentzii .....            | 12          | Sonchus arvensis .....              | 14, 114         |
| Rubus Selmeri .....              | 12          | Sonchus asper .....                 | 14              |
| Rubus villicaulis .....          | 12          | Sparganium ramosum .....            | 16              |
| Rumex acetosa .....              | 10          | Sparganium simplex .....            | 16              |
| Rumex acetosella .....           | 10          | Spergula arvensis .....             | 10              |
| Rumex conglomeratus .....        | 10          | Sphagnum papillosum .....           | 28              |
| Rumex crispus .....              | 10          | Spiraea ulmaria .....               | 12, 30          |
| Rumex longifolius .....          | 10          | Stachys ambigua .....               | 16              |
| Rumex obtusifolius .....         | 10          | Stachys palustris .....             | 16              |
| Sagina procumbens .....          | 10          | Stachys sylvatica .....             | 16              |
| Sagina subulata .....            | 10, 120     | Stachys sylvatica x palustris ..... | 75              |
| Salicornia herbacea .....        | 86, 116     | Stellaria glauca .....              | 79, 119         |
| Salix alba .....                 | 11          | Stellaria graminea .....            | 10              |
| Salix aurita .....               | 11          | Stellaria holostea .....            | 10              |
| Salix Caprea .....               | 11          | Stellaria media .....               | 10              |
| Salix cinerea .....              | 11          | Stellaria nemorum .....             | 10, 69          |
| Salix fragilis .....             | 11          | Stellaria uliginosa .....           | 10              |
| Salix pentandra .....            | 11, 30      | Sterna hirudino hirudino .....      | 29              |
| Salix purpurea .....             | 11          | Sterna maorura .....                | 29              |
| Salix viminalis .....            | 11          | Strobilomyces strobilaceus .....    | 61              |
| Sambucus nigra .....             | 13          | Stropharia Caput-Medusa .....       | 59, 60          |
| Sambucus racemosa .....          | 13, 77, 119 | Suaeda maritima .....               | 116             |
| Sanguinaria canadensis .....     | 67          | Symphoricarpus racemosus .....      | 13              |
| Sanicula europaea .....          | 13          | Symphytum officinale .....          | 15              |
| Sarothamnus scoparius .....      | 11          | Symphytum tuberosum .....           | 15              |
| Saxifraga granulata .....        | 69, 77      | Taraxacum officinale .....          | 14              |
| Scabiose arvensis .....          | 79          | Taxus baccata .....                 | 18              |
| Scabiose succisa .....           | 13, 86, 114 | Tellina sp. ....                    | 109             |
| Scilla nutans .....              | 16          | Tetrao urogallus urogallus .....    | 21              |
| Scilla verna .....               | 67          | Tenerium scarodonia .....           | 16, 114         |
| Scirpus caespitosus .....        | 17          | Thyatera batis .....                | 34              |
| Scirpus lacustris .....          | 73, 79      | Thygrophornis conicum .....         | 116             |
| Scirpus maritima .....           | 116         | Thymus Serpyllum .....              | 16              |
| Scirpus setaceus .....           | 17          | Tilia europaea .....                | 10              |
| Scleranthus annuus .....         | 120         | Triadia decumbens .....             | 17              |
| Scolopendrium vulgare .....      | 119         | Trientalis europaea .....           | 15, 33          |
| Scrophularia nodosa .....        | 15          | Trifolium medium .....              | 11, 73          |
| Scrophularia vernalis .....      | 120         | Trifolium minus .....               | 11              |
| Scutellaria galericulata .....   | 86, 114     | Trifolium hybridum .....            | 11              |
| Scutellaria minor .....          | 86          | Trifolium pratense .....            | 11              |
| Sedum acre .....                 | 12          | Trifolium repens .....              | 11              |
| Sedum anglicum .....             | 114         | Trigonogenius globulus .....        | 82              |

|                             |        |                              |        |
|-----------------------------|--------|------------------------------|--------|
| Triglochon palustre .....   | 16     | Veronica arvensis .....      | 15     |
| Trollius europaeus ..       | 9      | Veronica beccabunga ..       | 15     |
| Typha latifolia .....       | 16, 30 | Veronica Chamaedrys .....    | 15, 77 |
| Ulex europaeus .....        | 11     | Veronica montana .....       | 15, 77 |
| Ulmus montana .....         | 11     | Veronica officinalis .....   | 15     |
| Urtica dioica .....         | 11     | Veronica serpyllifolia ..... | 15     |
| Urtica urens .....          | 11     | Viburnum lantata .....       | 69     |
| Utricularia sp. ....        | 73     | Viburnum opulus .....        | 13, 69 |
| Vaccinium myrtillus .....   | 14, 76 | Vicia cracca .....           | 12     |
| Vaccinium Vitis-Idaea ..... | 75     | Vicia sepium .....           | 11     |
| Valeriana officinalis ..... | 13, 30 | Viola canina .....           | 77, 86 |
| Valerianella oliteria ..... | 119    | Viola lutea .....            | 10, 76 |
| Vanessa atlanta .....       | 34, 80 | Viola palustris .....        | 10, 76 |
| Vanessa cardui .....        | 34, 81 | Viola sylvatica .....        | 10, 86 |
| Vanessa io. ....            | 34, 81 | Viola tricolor ..            | 10     |
| Velveta macrostoma .....    | 123    | Xanthosia parietina .....    | 115    |
| Veronica agrestis .....     | 15     | Zygodon viridissimus .....   | 69     |



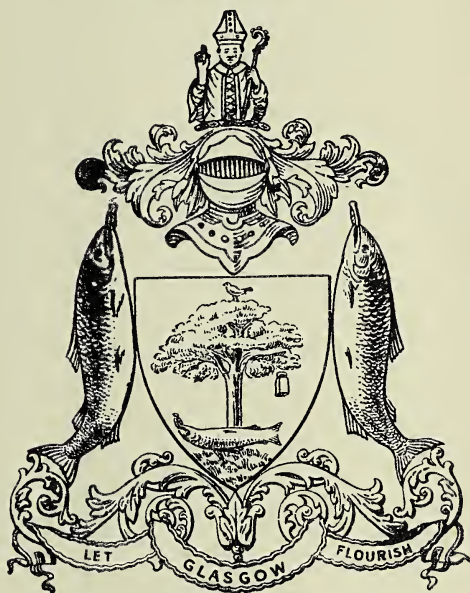




# The Glasgow ✧ Naturalist

*The JOURNAL of the*  
**GLASGOW AND ANDERSONIAN NATURAL  
HISTORY AND MICROSCOPICAL SOCIETY**

**including the**  
*Transactions and Proceedings*  
**of the Society**



VOLUME XVI

Edited by MABEL G. SCOTT, M.A., B.Sc.

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Published at the Societies' Room  
Royal Technical College, George Street, Glasgow

1952

# CONTENTS

| PAPERS—  | PAGES            |
|--|------------------|
| BRACKEN—A BOTANIST'S PLAYTHING AND AN AGRICULTURAL PEST.<br>K. W. Braid, M.A., B.Sc., B.Sc.(Agric.), F.R.S.E. ...        | 61               |
| THE STORY OF A MOORLAND GRASS ( <i>Molinia caerulea</i> )<br>Rev. Thomas A. Jefferies, M.Sc., F.L.S. ...                 | 68               |
| THE NEW ZEALAND WILLOW-HERB.<br>John R. Lee, M.A. ...  | 70               |
| MAJOR PESTS OF STOCK AND CROP IN THE WEST OF SCOTLAND.<br>D. Stewart MacLagan, B.Sc.(Agric.), Ph.D., D.Sc., F.R.S.E. ... | 74               |
| PHASE CONTRAST MICROSCOPY.<br>W. G. Hartley, B.Sc., F.R.M.S. ...   | 76               |
| THE ADAPTATIONS OF FRESHWATER GASTROPODA.<br>W. Russell Hunter, B.Sc., F.G.S. ...  | 84               |
| SOME INSECTS OF CAMBUSLANG, NEAR GLASGOW.<br>D. M. Lothian ...   | 86               |
| LIST OF FIRST ARRIVALS OF SUMMER BIRDS IN CLYDE AREA.<br>Thomas Robertson ...  | 3, 38, 91        |
| NOTES—   |                  |
| THE GREAT CRESTED GREBE NESTING WITHIN THE CITY.<br>William Rennie ...   | 1                |
| THE BADGER IN RENFREWSHIRE AND AYSRSHIRE.<br>John Boyd ...   | 1                |
| WAXWINGS IN LARGS AND WEST KILBRIDE.<br>John Boyd ...  | 2                |
| HAWK-MOTHS IN LARGS.<br>John Boyd ...  | 2                |
| THE OCCURRENCE OF HIATELLA IN THE CLYDE SEA AREA.<br>W. Russell Hunter, B.Sc., F.G.S. ...                                | 37               |
| THE LATE FLOWERING OF <i>FRAGERIA VESCA</i> .<br>J. Inglis Cameron, M.B., Ch.B., F.R.F.P.S.(Glasgow) ...                 | 67               |
| SOCIETY REPORTS ...  | 7, 41            |
| EXCURSION REPORTS ...  | 12, 41, 93, 95   |
| SECTIONAL REPORTS ...  | 18, 48, 98, 99   |
| DIGEST OF THE PROCEEDINGS OF THE SOCIETY—  | 26, 53, 101, 104 |
| OBITUARIES ...   | 31, 58           |
| INDEX ...  | 109              |

5.41 30 Jan 52

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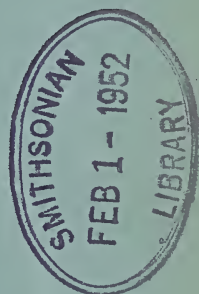
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## SUMMARY OF CONTENTS

---

|   | PAGES |
|---|-------|
| THE GREAT CRESTED GREBE NESTING WITHIN THE<br>CITY— <i>by William Rennie</i> ...      ...      ...  | 1     |
| THREE SHORT NOTES— <i>by John Boyd</i> ...      ...      ...  | 1     |
| LIST OF FIRST ARRIVALS OF SUMMER BIRDS IN THE<br>CLYDE AREA IN 1947— <i>Compiled by Thomas</i><br>ROBERTSON      ...      ...      ...      ... | 3     |
| SOCIETY REPORTS      ...      ...      ...      ...   | 7     |
| SOCIETY EXCURSION REPORTS      ...      ...      ...  | 12    |
| REPORTS FROM THE SECTIONS      ...      ...      ...  | 18    |
| DIGEST OF THE PROCEEDINGS OF THE SOCIETY      ...   | 26    |
| OBITUARIES      ...      ...      ...      ...      ...   | 31    |

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AND MICROSCOPICAL SOCIETY.

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Vol. XVI., Part I.

1951

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## THE GREAT CRESTED GREBE NESTING WITHIN THE CITY.

The Great Crested Grebe has been recorded several times within the last fifteen years at Possil Marsh. Prior to this they were extremely rare visitors, Autumn till Spring.

On 25th June (1947) at a Botanical Section outing to Possil Marsh, a pair were seen. The unusual occurrence at this time of the year naturally aroused curiosity as to the possibility of nesting, and Mr. Nicol Hopkins, writing to me in mid July mentions that he had on different occasions seen the adults accompanied by three young ones. I was informed later that there had been at least four in the brood.

WILLIAM RENNIE.

---

## THREE SHORT NOTES by JOHN BOYD.

### THE BADGER IN RENFREWSHIRE AND AYRSHIRE.

"The Largs and Millport Weekly News" of 6th June, 1941, reported that on the previous Monday night a car returning from Gourock to Largs struck and killed an animal which was darting across the road between the Cloch and Inverkip. It was brought back to Largs, when it was identified as a badger.

The same newspaper of 26th April, 1940, reported a badger being trapped by the gamekeeper at Brisbane, Largs.—J. B.

## WAXWINGS IN LARGS AND WEST KILBRIDE.

On 5th March of this year I was informed by Dr. Cairnie that he had heard that waxwings had been seen prior to that date in the garden of a resident in Douglas Street, Largs, and I later heard from another source that a lady living in the same street had seen them also in her garden.

On 14th March the "Largs and Millport Weekly News" reported that they had been observed recently at West Kilbride.—J. B.

## HAWK-MOTHS IN LARGS.

On 11th September, 1940, a burgh workman brought me a specimen of the *Convolvulus Hawk-Moth* which he had found while cutting the grass on the putting-green to the north of the town.

Dr. Cairnie, in reporting this to the local paper, stated that the previous records for this insect in Largs dated back to the closing years of the Great War, when two separate specimens were procured, one of them having found its way into a bedroom wardrobe.

He also informed me that between the two wars, date not known, a workman had brought him a *Death's Head Hawk-Moth* which he had found on the putting-green to the south of the town.—J. B.

# LIST OF FIRST ARRIVALS OF SUMMER BIRDS IN CLYDE AREA IN 1947.

## COMPILED FROM REPORTS OF MEMBERS AND FRIENDS.

By THOMAS ROBERTSON.

| BIRD.                    | DATE.                        | LOCALITY.  | Average Date<br>over 55 years. | Earliest<br>Date, 1946. |
|--------------------------|------------------------------|--|--------------------------------|-------------------------|
| Lesser Black-Backed Gull | March 9<br>" 13<br>" 24      | Glasgow Harbour<br>Largs.<br>Dumbarton.          | March 11                       | February 7              |
| Wheatear ... ..          | March 23<br>" 28<br>" 30     | Southend, Kintyre.<br>Largs.<br>Dalry.           | March 25                       | March 24                |
| Chiffchaff ... ..        | March 28<br>April 8<br>" 11  | Southend, Kintyre.<br>Dalry.<br>Bothwell Castle. | April 8                        | March 29                |
| Sand Martin ... ..       | March 31<br>April 11<br>" 13 | Motherwell.<br>Southend, Kintyre.<br>Darvel.     | April 9                        | March 30                |
| White Wagtail ... ..     | April 10<br>" 19<br>May 4    | Largs.<br>Summerston.<br>Dalry.                  | April 4                        | March 29                |



| BIRD.                     | DATE.             | LOCALITY.  | Average Date<br>over 55 years. | Earliest<br>Date, 1946. |
|---------------------------|-------------------|--|--------------------------------|-------------------------|
| Willow Wren               | ...<br>...<br>... | Bothwell Castle.<br>Southend, Kintyre.<br>Darvel.<br>Motherwell.<br>West Kilbride. | April 12                       | March 31                |
| Swallow                   | ...<br>...<br>... | Kilmacolm.<br>Gailes.<br>Milliken Park.  | April 10                       | April 3                 |
| Common Sandpiper          | ...<br>...<br>... | Milngavie<br>Largs.<br>Balgray Dam.  | April 13                       | April 15                |
| Terns (Common and Arctic) | ...<br>...<br>... | Largs.<br>Richmond Park, Glasgow.<br>Skelmorlie.<br>Southend, Kintyre.             | May 8                          | May 8                   |
| Cuckoo                    | ...<br>...<br>... | Kilmacolm.<br>Dalry.<br>Skelmorlie.  | April 22                       | April 19                |

| BIRD.          | DATE.    | LOCALITY.                | Average Date<br>over 55 years. | Earliest<br>Date, 1946. |
|----------------|----------|--------------------------|--------------------------------|-------------------------|
| Redstart ...   | April 24 | Pollok Park, Glasgow.    | April 26                       | May 21                  |
| House Martin   | April 25 | Clarkston, Glasgow.      | April 21                       | April 29                |
|                | " 25     | Largs.                   |                                |                         |
|                | " 26     | Balgray Dam.             |                                |                         |
|                | " 26     | Erskine Ferry.           |                                |                         |
|                | " 26     | Hurlet.                  |                                |                         |
| Swift ...      | April 26 | Balgray Dam.             | May 2                          | May 8                   |
|                | May 1    | Queen's Cross, Glasgow.  |                                |                         |
|                | " 3      | Largs.                   |                                |                         |
| Yellow Wagtail | April 26 | Balgray Dam.             | April 21                       | April 25                |
|                | May 12   | Lochwinnoch.             |                                |                         |
| Tree Pipit ... | April 26 | Fairlie.                 | April 23                       | April 25                |
|                | " 29     | Richmond Park, Glasgow.  |                                |                         |
|                | " 30     | Drumpellier, Coatbridge. |                                |                         |
| Whinchat ...   | April 27 | Dalry.                   | April 28                       | April 23                |
|                | May 3    | Largs.                   |                                |                         |
|                | " 12     | Southend, Kintyre.       |                                |                         |
| Corncrake ...  | April 28 | Southend, Kintyre.       | April 25                       | April 22                |
|                | May 4    | Beith.                   |                                |                         |
|                | " 7      | Motherwell.              |                                |                         |

| BIRD.   | DATE.                             | LOCALITY.   | Average Date<br>over 55 years. | Earliest<br>Date, 1946. |
|---|-----------------------------------|---|--------------------------------|-------------------------|
| Sedge Warbler ...                                       | May 2<br>" 7<br>" 7<br>" 7<br>" 7 | Southend, Kintyre.<br>Lochwood, Coatbridge.<br>Darvel.<br>Lochwinnoch.<br>Motherwell. | May 2                          | May 1                   |
| Common Whitethroat ...                                  | May 5<br>" 6<br>" 6<br>" 6        | Southend, Kintyre.<br>Drumpellier, Coatbridge.<br>Milliken Park.<br>Richmond Park.    | May 2                          | April 26                |
| Wood Wren ...   | May 7<br>" 10                     | Lochwinnoch.<br>Wemyss Bay.   | May 3                          | April 22                |
| Garden Warbler ...                                      | May 9<br>" 17                     | Pollok Park, Glasgow.<br>Largs.   | May 9                          | April 23                |
| Spotted Flycatcher ...                                  | May 10<br>" 11<br>" 13            | Southend, Kintyre.<br>Darvel.<br>Ballagan, Strathblane.                               | May 11                         | May 18                  |
| Grasshopper Warbler ...                                 | May 12                            | Lochwinnoch.  | May 5                          | May 11                  |
| Roseate Tern ...<br>Pied Flycatcher ...<br>Turtle Dove. | April 26<br>May 6<br>May 10       | Skelmorlie.<br>Kilmacolm.<br>Southend, Kintyre.                                       | Rarities seldom reported.      |                         |

## TREASURER'S ANNUAL REPORT, 1947.

This is the first year for which the increased subscriptions apply and, naturally, receipts show an increase over previous years. It is yet too soon, however, to draw any certain conclusions about the full effect of the increase. It will not be until the end of 1949 when the Roll is finally closed for 1947 that complete figures will be available to show the full effect of the increase.

At 31st December, 1947, there were 34 members in arrear, 20 for 1 year, 7 for 2 years, and 7 for 3 years.

Interest on the Special Investment in the Glasgow Savings Bank was reduced during the year from 3% to  $2\frac{1}{2}\%$ .

The substantial increase in expenditure is due to the heavy cost of printing and issuing "The Glasgow Naturalist" Vol. XV., Part II. The actual increase in this item was £28 but certain other expenses were down making a net increase in expense of £21. The above mentioned issue contained more pages than in the previous issue and the rate per page has increased. Any further advance in the rate will be serious and strain the finances of the Society.

## REPORT OF DELEGATE

to the British Association Meeting, Dundee, 1947.

Mr. J. R. LEE.

As your delegate, I attended the Conference of Delegates of Corresponding Societies in connection with the British Association for the Advancement of Science, whose meetings were held in Dundee from August 27th to September 3rd, 1947.

Two meetings of the Conference were held: the first on Thursday, 28th August, when the President of the Conference, Dr. J. Ramsbottom, delivered an address, his subject being "The Natural History Society." In this address Dr. Ramsbottom briefly sketched the work of Natural History societies in the past, and the importance of that work as an integral part of the progress of scientific research, and its value as a contribution to the great advances in knowledge during the latter half of the nineteenth and the early years of the twentieth centuries. He then proceeded to examine the question as to the part which such societies may still take in the modern world, when science has become much more highly specialised



and when new and more advanced methods are called for. His address was listened to with great interest, even by those delegates whose scientific interests were not immediately concerned with the subjects embraced by the term "natural history," and his conclusions were to the effect that there is not only still an important place to be filled by societies such as our own, but that in many ways their work can be even more essential than formerly, in as much as the laboratory worker must perforce depend more and more upon the direct observations of others whose researches take them out into the field.

The second meeting of the Conference took place on the following Monday, 1st September, and was given up to a discussion of some proposals, which had arisen largely as an outcome of Dr. Ramsbottom's remarks. The first of these proposals was embodied in a motion put forward by Professor Balfour-Browne, of which he gave notice at the former meeting. This was to the effect that the British Association should be requested to renew a former practice—the publication annually of a list of papers appearing during the year in the Journals of the affiliated societies. Further suggestions were the reprinting of important contributions to the Transactions of Corresponding Societies in an annual volume by the British Association; the formation of a central committee to co-ordinate the activities of local societies; arranging panels of lecturers, and the question of the financial implications thereby involved; and the production of large-scale maps as a means of classifying and correlating natural history records. The discussion was interesting as indicating a general desire that the work of local societies should be made more effective for the furtherance of scientific research; but it tended to roam over too wide a field for any definite result; and in its early stages it took what seemed to my mind a somewhat unfortunate turn, calling forth some apparent feeling about the difference between the labours of the "professional" and the "amateur" scientist. Feeling that the discussion was tending to suggest some antagonism between the two, I felt (reluctantly) called upon to intervene, and I insisted, with some emphasis, that there should be no such antagonism, using as my argument that in the society which I had the honour to represent we had always had a mixture of both elements, who had worked harmoniously together, the "amateur" finding in his "professional" colleague one always willing and eager to support and help, and the "professional" at all times ready to acknowledge the value to himself of the work of the "amateur." It was with some surprise and not a little feeling of being taken aback that I found myself followed immediately

by the President of the British Association, Sir Henry Dale (whose presence I had not previously noticed, but who had slipped in to the Conference to pay us a friendly visit). Sir Henry took up the point where I had left it, claiming himself as an "amateur" in natural history and a member of a local society which he thought was doing excellent work with the cordial co-operation of both types of worker. For the rest, the Conference agreed that the views expressed should be passed on to the Council of the Association for their consideration.

As to the general meetings of the various sections during the week, one may say that the Dundee gatherings were quite equal in enthusiasm and quality to any of the previous meetings of the Association in pre-war days. We had an excellent send-off on the first evening, when Sir Henry Dale's Presidential Address on the theme of "Science in War and Peace" laid the emphasis upon the duty of the British Association to place the whole weight of its influence upon the endeavour to render the progress of scientific discovery and achievement a means of furthering harmony and goodwill among the nations. This was, in fact, the avowed intention of the Association in its meetings on this occasion, the general motto adopted for the Dundee Meeting being the phrase "swords into ploughshares."

On Friday morning, 29th August, there was a most interesting discussion on the subject of Penicillin and other antibiotics, which jointly occupied the sections of Chemistry, Physiology and Botany, and naturally attracted a large attendance of the members of all three sections. The subject was introduced appropriately enough by Sir Alexander Fleming, who had some witty anecdotes to recount in connection with his great discovery. The chemistry of the subject was dealt with by Dr. E. Chain, and also by Dr. S. E. Michael; and the biological aspect by Dr. Ramsbottom.

Another special feature was an evening lecture on the ever-interesting subject of "Camouflage" by Dr. Cott, who is well known for his powers as a lecturer as well as his perhaps unrivalled knowledge of this attractive department of science.

One has little enough time to devote to the many-sided programmes of the British Association during its annual meeting; and I found it impossible to do more than attend a very few of the items on the agenda on Section K (Botany). The President of the Section, Dr. H. Hamshaw Thomas, gave us a very interesting address on the History of Plant Form, and various other speakers dealt with questions of classification, of evolution, and of ecology, many of their conclusions

and suggestions being of importance for the general student, but mostly dealing with highly technical matters that were perhaps more in the nature of suggesting lines of research for future study. One paper, however, was calculated to arouse criticism. This was a contribution by Professor J. Small, on some "Laws of Organic Evolution," which challenged many widely accepted views on this still thorny subject. Unfortunately—or perhaps fortunately—his paper was last on the agenda, coming at the very end of the final meeting; and no time was left for the discussion which, had it taken place, might well have furnished one of the liveliest items of the week.

Of a number of excursions, sectional and general, from which one was invited to make selection, I had intended to take part in two. The first was to Glamis Castle, where a limited number of members of the Association were invited to a "garden party." The tickets for this were, however, allotted by ballot—and I was unsuccessful. The other was an outing of the Forestry Section, the venue being Dunkeld and the Atholl Estates. This took place on the Saturday, 30th August, in fine weather, and was attended by a very select few, most of whom were experts on the subject of the coniferous forests now springing up all over the country. The outing was a very enjoyable one, and as the major part of the district passed through was quite new to me, it afforded an opportunity of extending my knowledge of the Perthshire Highlands to a region in which scenic beauty combines with richness in historic and legendary lore to render a day's tour an experience worth having.—JOHN R. LEE.

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## REPORT ON WEST OF SCOTLAND FIELD STUDIES COUNCIL FOR YEAR 1947-1948.

The Council has continued to foster many useful contacts between societies and individuals.

Last September a highly successful exhibit was displayed at the Youth and Recreation Exhibition in the Kelvin Hall. The artistic design of the stand was due to Mr. James Miller. A large number of societies co-operated. Numerous enquiries regarding specimens, etc. were received during the course of the exhibition. Two film displays showed natural history and Highland scenic features to 1,000 members of the public during the course of two evenings. On a third, the film booking was sub-let to the Youth Hostels Association.



The National Trust for Scotland, who co-operated with the Council in the display, were gratified to obtain four or five new members, one of them a life member. As a result, the co-operation between Trust and Council on natural history and historical matters is now close and cordial. The Trust has nominated Mr. J. H. Stainton Crosthwaite to represent them on the Council. Professor Walton has been invited by the Trust to undertake part of the ecological survey of Trust property.

The Council had the pleasure of a visit from a representative of the "Scottish Field" to their stand, the "Month in Scotland" feature in the October number of that journal being thereafter devoted to the Council and its work.

A suggestion that the Marquis of Bute might provide the Council with an empty house in Bute, while being warmly appreciated has not yet been accepted on account of the difficulties entry would entail.

Having frequently discussed the desirability of a wild-flower display in the Art Galleries and Museum, the Council congratulate Mr. Rennie on his successful co-operation in this matter with the museum officials during the summer months and trust he will find it possible to repeat the exhibition this year.

The exposure of part of the Roman Wall at Goldenhill, Duntocher, under the supervision of Miss Anne Robertson induced the Council to associate itself with the efforts to preserve as much of the wall as possible from the effects of building. It seems likely that more than 3 miles of the wall between Old Kilpatrick and Bearsden will be free from this danger for all time coming.

The Council is also acting in association with the A.P.R.S. (Association for Preservation of Rural Scotland) to protect Clyde Lochs and surrounding territory from the encroachments of the Admiralty and War Office.

A suggestion made last year for an Arbour Day in Glasgow or the West of Scotland was referred by the Council to the Tree Lovers Society. That body has set up a joint committee of representatives from Society and Council to examine the proposal more fully. As a result, a meeting of various representatives from Glasgow and the West of Scotland is to be held in the near future. Interesting developments in this effort to interest school children in the care of the amenities of their own districts are therefore possible.



The editorial work has been continued in connection with the Introductory Guide. It has not yet been completed however.

The Executive Committee are at present considering the implications of the Dept. of Health Report "National Parks and Conservation of Nature in Scotland" with a view to possible action.

---

### ANNUAL REPORT OF LIBRARIANS.

During the year 1947 the number of volumes issued to members of the Society was 40 and these were classified as follows :—

|             |     |     |     |    |
|-------------|-----|-----|-----|----|
| General     | ... | ... | ... | 13 |
| Zoology     | ... | ... | ... | 9  |
| Botany      | ... | ... | ... | 9  |
| Entomology  | ... | ... | ... | 4  |
| Geology     | ... | ... | ... | 4  |
| Ornithology | ... | ... | ... | 1  |

As in former years we have been able to meet the needs of other home societies in giving access to publications which otherwise they would have difficulty in consulting.

It had been hoped last year to complete the weeding out of unwanted or duplicate volumes from the shelves but although some 95 volumes have already been marked down in this category the list is still incomplete.

J. C. GRAHAM,

R. HODGE,

*Honorary Librarians.*

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### EXCURSION TO THE TROSSACHS.

26TH MAY, 1947.

Nineteen persons took part in this excursion, which was of a somewhat unusual, though not quite unique, character. A bus had been specially chartered for the occasion, the date—Monday, 26th May, being a public holiday in the city. Leaving from the north-east corner of George Square at 9.30 a.m., the route taken was via Maryhill and the Drymen Road to Drymen, thence across the Flanders Moss to Gartmore and

Aberfoyle. After a short time at the Clachan, where a welcome cup of tea was partaken of, the journey was continued by what is commonly known as "the Duke's road" to Loch Katrine. Some time was spent here; and after partaking of lunch, the road to Callander was followed, with a pause at the Brig of Turk to explore the entrance to Glenfinlas. Arrangements had been made for the party to arrive at Callander by 5.30 p.m., and the bus was there well up to time. Up to this point the weather had been rather disappointing. Though there was no definite rain beyond a few light showers, the higher hills were for the most part obscured every now and then by thin mist, and we were not favoured by sunshine such as would give to this charming district the setting required to bring out its almost unrivalled beauty. On leaving Callander, however, a decided improvement set in, and the return journey across the Vale of Menteith to Kippen, thence by Killearn, Strathblane and Milngavie was thoroughly enjoyed.

Stops were made during the journey, both outward and homeward, to enable the party to observe the geological and botanical features of the districts passed through. Unfortunately, the misty morning prevented the far-spreading views from the Drymen Road being fully obtained; but the principle points of interest along the route were noted, such as the gorge of Finnich Glen, the beautiful strath of the Endrick, and the bold outlines of the Kilpatrick and Campsie Hills looming darkly in the background. Guallen and the Conic Hill were visible as part of the outliers of the Ben Lomond *massif*; but the mighty Ben himself was completely obscured throughout the whole of the day. The great heather-clad area of the Flanders Moss attracted attention, with the sluggish waters of the Kelty Burn winding its way eastwards to its junction with the Forth. The beautifully situated village of Gartmore detained the party for a short time, from which point the road descends to Aberfoyle through the interesting scenery afforded by the proximity of the Highland Line. From the geological standpoint, the village of Aberfoyle is a locality of very particular interest, for the great Highland Fault passes through its middle, the hills on the flanks of the "Duke's Road," illustrating this feature very clearly; Craigmore, on the west, being formed of the prevailing mica-schists, while Braevall, quite close by on the east, is a mass of conglomerate of Red Sandstone age.

On the next stage of the journey, from Aberfoyle to the Trossachs, a stop was made at the bridge above the glen leading down to Loch Drunkie, a part where more time than

we had to spare would have been valuable to the botanists of the party, but it was possible to note the wealth of typical highland vegetation which the locality affords. A short walk from here to the brow of the hill, where the bus was waiting, enabled those who cared to witness something of the unique transformation in the scenery which is afforded by the sudden turn of the road, where one passes from the closely hemmed-in views of the near-hand hill-slopes to the far-reaching prospect of the glorious panorama of mountain-land which we call the Trossachs. On this occasion the lack of sunshine detracted considerably from the beauty of this charming prospect; but there was sufficient visible to delight the eyes of the party; and although the great mass of Ben Venue was only occasionally and fitfully revealed, that celebrated mountain commanded the admiration of every one, the mist effects perhaps adding somewhat to the sense of majesty which it always inspires.

A ramble through the Trossachs is at any time and in any circumstances something of an inspiration. One always feels that time is too short to explore its wonderful and intricate pathways and its deep gorges; and as for the proper observation of its natural history, one would, of course, require a lengthened holiday period in which to do it anything like justice. A few hours spent in its recesses, or upon the flanks of the mountains surrounding it, might have resulted in the party being able to report a lengthened list of things seen and noted. As it was, the members had to rest contented with distant views of the crags of Ben Venue, the birch-clad slopes of Ben An, the far-stretching expanse of Loch Katrine with the hills of Glengyle beyond, and a close-up look at Ellen's Isle, near which was pointed out the place where, years ago, was the once famous "silver strand," now, alas! submerged beneath the waters required by the thirsty populace of our great and growing city.

The journey to Callander took the company along the lovely margin of Loch Achray, past the juniper bushes of Lanrick Mead—a botanical feature of special interest—and by the shores of Loch Vennachar to Coilantogle, near which the "highland line" was again crossed close to the confluence of the Leny and the Teith.

The return to the city being by way of the village of Kippen, a halt was made there in order to visit the famous Big Vine. There seems to be some doubt about the question as to which is the biggest vine in the country, the claims of Hampton Court, Killin, and Kippen being upheld respectively by the varying opinions of people who are supposed to know. Without presuming to express any views on a matter which seems to



admit such diversity, it may be said with confidence that the Kippen Vine is at least one of the biggest. The party came away duly impressed ; and, taking leave of the village, enjoyed the last lap of the day's journey, via the Fintry Valley and Strathblane, arriving back in the city well satisfied with an exceptionally fine day's outing.—JOHN R. LEE.

## EXCURSION TO CLEGHORN WOODS,

5TH JULY, 1947.

Nine members took part in this outing in fine weather, travelling by train from Central Station to Cleghorn, thence walking via the Woods down the valley of the Mouse and along the top of the Cartland Craggs, and returning to the city by bus.

At the outset a large bed of a species of Comfrey, evidently an introduction, but spreading and in fine flower, was observed by the road-side near Cleghorn railway station. The plants, about four feet high, and with a profusion of blue-purple flowers, were of very strong growth. The species was believed to be *Symphytum asperrimum* Donn.

A little way further along the road several plants of *Rumex longifolius* DC. were noted.

From the pathway along the Cartland Craggs the famous view-point from which one of the finest scenes in the "Upper Ward" can be surveyed detained the party for some time. The atmosphere being particularly clear on this occasion, the view across the Clyde valley, with Lanark in the middle distance, and the impressive mass of Tinto furnishing an appropriate background, called forth the delighted admiration of the members.

This being a favourite hunting ground of the botanists, some considerable attention was paid to the rich flora of the locality, but no new feature was seen. The most noteworthy of the plants observed were the rock-rose (*Helianthemum Chamaecistus* Mill.) and some fine specimens of the hispid hawkbit (*Leontodon hispidus* L.). A considerable abundance of the common cow-wheat (*Melampyrum pratense* L.) was noted, as were also the grasses *Melica uniflora* Retz., *Melica nutans* L., and *Milium effusum*, L.—JOHN R. LEE.



## REPORT OF EXCURSION TO BEITH DISTRICT ON

2ND AUGUST, 1947.

Nine members took part in this excursion, which was carried out in dull and threatening weather conditions, although the afternoon kept dry until near the end of the ramble. Owing to a misunderstanding, Mr. Dugald Semple, who was to have acted as the official conductor, was unable to be present, but as the ground to be traversed was familiar to some members of the party, no difficulty was experienced in carrying out the afternoon's programme.

On arrival at Beith Station by train, the subsequent route followed was into the hilly country situated to the north-east of the town, over ground rich in historical, antiquarian, geological, and botanical features. The road led upwards to Bigholm Hill, where the ill-fated Beith War Memorial suffered damage on two occasions before being finally removed to the town. Near here several fine views of the beautiful surrounding country were obtained, including the Kilbirnie and Castle Semple Lochs.

Much of the countryside hereabouts is associated with St. Inan, a rather little known saint of early times, who seems to have spent much of his itinerant ministrations in the district. Visits to St. Inan's Well, and to his Chair—prominently situated high up on the hillside, with a far-reaching prospect all around—were paid by the members, a few moments seated in the Saint's Chair being considered a necessary tribute to his memory. Not far to the east of this point is the location of a "rocking stone" well known in the district, which it had been intended to visit; but as the weather seemed to be somewhat threatening by this time, it was decided to omit this part of the programme.

Descending from the hills, the route passed close to the "Wheelhouse," the residence of Mr. Semple, near which the party met a friend of his, who expressed on his behalf the regret with which he had found himself unable to be present with them. Close to this spot is the famous waterfall immortalised by Robert Tannahill as the Warlock Craigie in the song, "O are ye sleeping Maggie."

Before reaching the main Glasgow Road, a halt was made at a farm where a supply of milk added considerably to the pleasures of an "al fresco" meal. This over, the party made their way to the main road when the rain commenced, and without delay a return to the city was made by bus.

The interests of the party during the afternoon were chiefly botanical ; and the summer being well advanced the plants noted were mostly the flowers of late summer and early autumn. The following is a list of those most noteworthy :—

*Lepidium Smithii* Hook. ; *Viola lutea* Huds. ; *Hypericum pulchrum* L. ; *Scabious arvensis* L. (in very fine condition near Beith) ; *Centaurea nigra* L. (a remarkable form with large heads and with the outer florets tending towards the form of a ray) ; *Crepis paludosa* Moench. ; *Mimulus lutea* L. (abundant) ; *Thymus Serpyllum*. L.

RICHARD PRASHER, *Conductor*.

## EXCURSION TO MUIRSHIELS, LOCHWINNOCH.

MONDAY, 29TH SEPTEMBER, 1947.

This outing, the longest of the season, saw an attendance of only eight members. From the starting-point at Lochwinnoch till their return by Kilbarchan about eight hours later they were assailed by almost hourly squally showers, but always by good luck at sheltered points. Between the showers the weather was fine.

There was a rather poor display of material worthy of report, but, botanically, the Hop (*Humulus lupulus*) and the Broad-leaved Ragwort (*Senecio sarracenicus*) were both observed. The Hop displayed a fine profusion of female flowers (the hop of the brewer). A naturalised plant which is well established near Lochwinnoch and was in fruit was the Snowberry (*Symphoricarpus racemosus*).

On two occasions during the day, swallows were seen, a rather rare occurrence at this time of year, and particularly so at the rather isolated localities concerned.

The geological attraction was the mine at Muirshiels, cut into the lavas of the Misty Law area, which produces at present probably more barytes than any other British mine. Here we saw the pink vein, filling the whole roof of the inway, and heard an erudite and highly technical dissertation on mines, mining and barytes.

## BOTANICAL SECTION.

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### REPORT FOR THE YEAR 1947.

Nothing of outstanding interest or importance falls to be reported as a result of the Section's activities during the year 1947; but it is satisfactory to be able once again to record that botanical studies continue to attract the attention of a large number of our members, a fact that is evidenced by the substantial proportion of such matters appearing on the programme at our monthly meetings, as well as the well-maintained attendances at the Sectional excursions during the summer. Although in this latter respect there was considerable variation, the average attendance over the fifteen excursions was twelve, the actual numbers ranging from 26 to 2. Thirteen of these outings took place on Saturday afternoons, and two on Wednesday evenings. With two exceptions all were carried out in fine weather conditions.

One of the exceptions was the first of the season, held on 29th March, which was specially devoted to a search for mosses in the Allander Woods above Milngavie. Seven members took part; but owing to a heavy drizzle, which made conditions uncomfortable, the outing was curtailed to a large extent. The next two excursions were likewise of special interest to those of our members, particularly intent in the study of the Bryophytes.—one on 12th April to Newton for a visit to the glen of the Rotten Calder, and the second a walk from Lennoxton to Campsie Glen via the Crow Road. The former attracted only four members, who, however, made the most of their opportunities by extending the ramble to include a visit to Blantyre Priory, where the well-known bush of Spurge-Laurel (*Daphne Laureola* L.) was observed, and it was noticed that the plant had suffered severely from the exceptional winter conditions prevailing during the early part of the year. The next outing, to the Campsie district, was well attended. On 19th April, sixteen members travelled by bus to Lennoxton, and a most enjoyable walk was taken up the Crow Road as far as "Jamie Wright's Well." Besides a considerable list of mosses observed, many other features of interest were noted, particularly the abundant growth of the mossy saxifrage (*Saxifraga hypnoides* L.) covering the rocks just above the well.

On the following Saturday, 26th April, an outing to Darnley Glen and the Balgray Dam attracted the largest attendance of the season. Besides our own members, numbering 26,



there were also present a number of young members attracted through the activities of the Field Studies Council—a welcome development which we would like to see extended. The excursion had been arranged jointly with the Ornithological Section, and there was thus abundant opportunity for observing the many Natural History features of this district. To the botanists the outstanding item was the large patch of White Butter-bur (*Petasites albus* Gaertn.) which was seen in fine flower.

Visits to Kelly Glen on 10th May and to the Pollok Estate on 17th May attracted good attendances (14 and 17 respectively), both covering very interesting ground. The Pollok outing especially gave opportunity to observe many unusual plants, as a permit had been given for access to the private parts of the Estate as well as the portion open to the public.

On 31st May, twenty-four members carried out a walk from Johnstone to the western end of the Gleniffer Braes with the object of visiting Bardrain Glen. The weather was warm and sunny, and the walk was much enjoyed; but there had been earlier in the day a heavy thunderstorm, as a result of which the stream was found to be in heavy flood, rendering the crossing impossible. This was something of a disappointment, as it prevented the party from attaining the principle object of the visit—a sight of the flowers of the Chickweed Wintergreen (*Trientalis europaea* L.) in the well-known corner where its occurrence has been so often noted. A fairly long list of flowering plants was, however, made up, including the early purple orchis (*Orchis mascula* L.). This is one of the most beautiful of the British orchids; and, although not rare in our district, it is particularly abundant in the moorland area to the north and west of Bardrain Glen.

The month of June, always the most attractive part of the year to field-botanists, called out good attendances of members of the Section. The month started badly, however, as the excursion on the 14th to the Fiddler's Gill near Braidwood was one of the two outings partly marred by rain. The attendance was good, however, nineteen members taking part and there resulted a fairly long list of plants observed in spite of the weather, the most notable items being the Evening Campion (*Lychnis vespertina* Sibth), Lesser Wintergreen (*Pyrola minor* Sw.), and Herb Paris (*Paris quadrifolia* L.).

On the evening of Wednesday, 18th June, a ramble to the ever popular Milngavie district covered practically the same ground as on the wet day in early spring already referred to. This time, however, the conditions were ideal—a warm, sunny



day, and an abundance of floral favourites to delight the members, nine in number, who turned up at the usual rendezvous at Milngavie Cross. Special attention was paid to the rare shrubs which have for so long been a feature of the pathway by the old mill-dam near Clober, after which a walk through the woods yielded a long list of flowers observed. The most notable of these were the globe-flower (*Trollius europaeus* L.), bog-bean (*Menyanthes trifoliata* L.), and the common butterwort (*Pinguicula vulgaris* L.). The sundew (*Drosera rotundifolia* L.) was also noted, but not in flower; as was also the rare bedstraw (*Galium uliginosum* L.).

Three excursions followed closely upon this, all largely concerned with the study of marsh vegetation. A walk along the bank of the Monkland Canal from Riddrie to Baillieston on Saturday, 21st June; an evening visit to Possil Marsh on Wednesday, 25th; and a breaking of new ground by an outing on Saturday 28th to the moorland swamps on the hills north of Kilmacolm. The two former yielded nothing new; but among the familiar features of the localities it was observed that the interesting *Carex disticha* Huds. seems to be spreading in both places. Some of the hybrid willows at Possil aroused particular attention; and an increasing scarcity of the dwarf willow (*Salix repens* L.) was noted with some regret. The Kilmacolm locality was of special interest, and proved to be a rich hunting ground for plants characteristic of marshland, and manifestly well worth a more extended visit. On the drier parts many moorland species were observed, among them an abundance of the mountain pansy (*Viola lutea* Huds.), both the typical yellow and the more common blue forms being seen. One of the most interesting finds was the rather scarce *Carex teretiuscula* Good. Another was a fair abundance of the tufted loosestrife (*Lysimachia thyrsiflora* L.). Near the railway station at Kilmacolm the rare *Lactuca muralis* Fresen. was noted in flower.

Three Saturday excursions during August brought the summer's outdoor activities to an end so far as the official programme of the Section was concerned. The first was a visit to Neilston Pad on 9th August, in which nine members took part. The day was very fine, and a most enjoyable ramble culminated in a fine view from the top of the Pad, where the members regaled themselves with the berries of the blaeberry bushes in abundant fruit while resting after the exertion of climbing the hill. On the way from Neilston village, the station for *Lamium Galeobdolon* Crantz was noted, but the plant, still surviving, was past flowering.

A somewhat abortive excursion followed on Saturday, 16th. The objective was the favourite ground at Tollcross sand-pits ; but although a fine warm afternoon gave promise of a pleasant outing, only two put in an appearance. The date was in all probability the explanation, most of our members being still "on holiday intent."

The final excursion of the summer, and in some respects one of the most important in its results, followed on 23rd August, when nine members visited Kilwinning. The route followed lay along some stretches of waste ground along the banks of the River Garnock, where a large number of uncommon plants were to be seen. The total number of species noted was about eighty, the most important of which were *Lepidium Smithii* Hook., *Reseda luteola* L., *Geranium lucidum* L., *Potentilla reptans* L., *Aethusa Cynapium* L., *Senecio saracenicus* L., *Echium vulgare* L., *Convolvulus arvensis* L., *Verbascum Thapsus* L., and a white-flowered form of the common red clover (*Trifolium pratense* L.).

Of other activities of the Botanical Section during the year, reference may be made to the exhibits in connection with the Field Studies Council during the exhibition in the Kelvin Hall which were sent in by some of our members. This exhibition, in which other sections of the Society took part also, proved of considerable interest, and it is hoped may have resulted successfully in fostering the objects for which our Society exists.—RICHARD PRASHER, *Convener*.

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## ENTOMOLOGICAL SECTION.

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### REPORT FOR THE YEAR 1947.

During the year 1947 some parts of the country were threatened by the War Office.

Among these may be mentioned Cannock Chase, Staffordshire, an area long recognised as a splendid place for the nature student, and particularly so to the Entomologist.

I sent a copy of our Report to the Clyde Planning Committee, to my friend, Dr. J. S. Sharpe, of Stafford, who placed it in the hands of a committee formed to deal with the threat.

I am sure we all wish them well in their endeavour to preserve as much as possible of this fine productive area.

In September, the Entomological Section made a contribution to the general exhibit by the West of Scotland Nature Study Council, for the Youth Recreation Exhibition in the Kelvin Hall, Glasgow.

Specimens were supplied and arranged by Messrs. W. Russell, M. Maclaurin, D. Lothian, J. W. Leslie, and myself.

Dr. D. Patton supplied an example of the Colorado Bettie (*Leptinotarsa decemlineata* Say) and this proved a great attraction. Many people having read about the trouble caused by this pest were quite keen to see what it looked like.

A small selection of Ladybirds of somewhat similar size and shape, also on view, may have done something towards preventing confusion in identity.

The brightly coloured Butterflies, Moths, Dragonflies, etc. on view were much admired, and the various ladies and gentlemen in attendance were often questioned on various points.

The past season proved quite a good one for our Lepidopterists, but the cold spring made the Butterflies late in appearance.

Mr. Maclaurin found the Small Tortoiseshell, *Vanessa urticae* Lin, three weeks later in appearing than in 1946. Mr. Lothian first noticed this species on the 13th April, 1947, 18th February, 1946, and 23rd March, in 1945.

During the year, quite a large number of Clouded Yellow Butterflies (*Colias Croceus*) were observed and captured by various Lepidopterists in our area.

Mr. J. Boyd has furnished me with quite a number of records of his own observations and those of Dr. Cairnie and Mr. Paton. These are as follows :—

Aug. 16—S.W. Cumbræ, 5 specimens.

" 19—N.W. Cumbræ, 1 specimen.

" 20—Between Troon and Prestwick, 5 specimens.

" 22—S. W. Cumbræ, single specimens 20 times and pairs 4 times.

" 21, 23, 24—Estuary of Noddle Burn, Largs, 2 on each date.

26—1 at Kilwinning, 1 at Bogside, and 1 between these places.

" 30—Several were seen at Ettrick Bay, Bute.

Sept. 6—Last specimen seen at Estuary of Noddle Burn, Largs.

Mr. Maclaurin advises me that Mr. Robert Wilson secured a specimen at Lang's Engineering Works, Johnstone, on the



1st September, a further specimen being secured at the same spot on the 6th September.

This is the first record of this species for Renfrewshire, and brings the county total of species of butterflies up to 19 out of the 60 odd British.

Mr. Boyd noticed that Knapweed and Bird's foot trefoil were about equally favoured by this butterfly, but Sea Radish, Ragwort, Devil's bit, Scabious and Red Clover was also visited. Mr. Maclaurin also mentions Red Clover and the leaves of Coltsfoot.

Mr. Nicol Hopkins has made his usual census of the butterflies seen in the various parks in and around the city. While some of the parks are quite close to one and other, such as King's and Linn, and it may well be that the same specimen may have been counted more than once. The list does show the relative abundance of the various species. The period covered was from the 28th August to 3rd October, as follows—

|  |     |     |     |
|--|-----|-----|-----|
| Red Admiral ( <i>Vanessa atalanta</i> Lin) | ... | ... | 153 |
| Painted Lady ( <i>Vanessa cardui</i> Lin)  | ... | ... | 14  |
| Peacock ( <i>Nymphalis io</i> Lin)         | ... | ... | 8   |
| Clouded Yellow ( <i>Colias croceus</i> )   | ... | ... | 2   |

Turning now to the Moths. Perhaps our most interesting immigrant was the Humming Bird Hawk Moth (*Macroglossa stellatarum* Lin). This interesting and very aptly named species has been seen on several occasions by members, as follows :—

15th June, at Kilmacolm, about Rhododendron flowers by Mr. Maclaurin.

3rd September, at Kilmacolm, a crushed specimen in a window jamb, also by Mr. Maclaurin.

27th September, at Kilmacolm, by Mr. Lothian.

3rd October, at Langside, by Mr. N. Hopkins.

In the E.M.M. for Sept. a specimen is recorded by Dr. Black as having been taken in Glasgow.

A specimen of the Convolvulus Hawk Moth (*Sphinx convolvuli* Lin) was secured by Mr. Maclaurin at Kilmacolm about 3rd September.

The following three species of moths, secured by Mr. Maclaurin, are new to Renfrewshire :—

1st June, Brown Silver Lines (*Lozogramma petrarua* Hubnor), at Kilmacolm.

12th July, Large Emerald (*Geometra papulionaria*, Lin.), at Georgetown.

6th September, Golden Rod Brindle (*Lithomoia solidaginis*, Hb.), at Houston.



Between the 13th and 18th September several specimens of the Dark Sword Grass (*Agrotis Suffusa*, Hb.) and the Pearly Underwing (*Agrotis saucia*, Hb.) were taken at Kilmacolm.

On the 5th June, Mr. Lothian was attracted to what appeared to be a brown leaf blown by the wind round the wire of a fence. On investigation this proved to be a specimen of the Coxcomb Prominent (*Lophopteryx camelina*, Lin.).

Mr. Lothian visited the Lochaber district in July, finding the Scotch Argus (*Erebia aethiops*, Esp.) and the Mountain Ringlet (*Erebia epiphron* Knock, Common), in the latter case, however, the specimens were all males.

The Dark Green Fritillary (*Argynnis aglaia*, Lin.), was not uncommon and only one specimen of the Common Blue (*Polyommatus icarus*, Rott.) was seen.

Mr. J. W. Leslie visited Surrey in August and secured a specimen of the Clouded Yellow (*Colias croceus*) and a Humming Bird Hawk Moth (*Macroglossa stellatarum*, Lin.). Quite a large number of Coloptira, chiefly *Phylophaga* and *Rhynchophora* were also secured.—THOS. H. M. GORDON.

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## GEOLOGICAL SECTION.

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### SUMMARY - 1947.

The past year was memorable for the high quality of the papers read in the early part of the year. Those contributing to the success of these evening meetings were the same old band of enthusiasts, with one notable exception—Mr. Forrest, who read a very interesting paper on a visit to the Loch Assynt District of Sutherland, an expedition in which four of our members took part. The paper was followed by one on the Petrology of the same district by Mr. Holloway and these papers were illustrated by lantern slides of high quality exhibited by Mr. Holloway. The papers and the extraordinary number of hand specimens tabled led to considerable good-humoured and instructive discussion in which all members joined.

The other papers read were of the usual standard and the lantern slides produced by Mr. Kirkwood to illustrate his paper on the Geology of the Cape of Good Hope deserve a special word of praise.

Six excursions were held during the summer months, but these were not up to standard and nothing of any great interest was discovered. Unfortunately, too, the evening meetings usually resumed in October could not be held until after the New Year owing to circumstances outwith our control (a technical fault in the Convener).

We have also to record the publication of a book which, in its abridged form, was read as a paper at one of our evening meetings by Mr. Rennie in 1944 and titled "Smatterings." The paper, as you will remember, dealt with the early struggles of the Glasgow Geologists to establish themselves within the city. This book is the result of a wealth of research and gives details of the meeting-places, etc., with notes of interest not only to geologists, but to all Glasgow naturalists, and fills a long-felt want.

The only other happening of interest in the past year was the Exhibition of Fossils and Geological Photographs undertaken by the Section in connection with the Youth and Recreation Exhibition in the Kelvin Hall in September. The specimens were displayed in a manner calculated to appeal to youth and a considerable amount of interest was aroused and should bear fruit in the future. It is of interest to note that the specimens on exhibition were, with the exception of three fossil fish, from the private collections of members of this Section.—W. CANNON.

## DIGEST OF THE PROCEEDINGS OF THE SOCIETY.

SESSION XVII—1947.

*President*—Prof. JOHN WALTON, M.A., D.Sc.*Vice-Presidents*—

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*Representative to the Committee of the Scottish Marine Biological Association*—

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*Representatives to West of Scotland Field Studies Council*—

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CHAS. D. MACFARLANE.

JAMES R. WOOD, C.A.

## SOCIETY MEETINGS.

14TH JANUARY, 1947.

Professor John Walton, President, occupied the chair at the first meeting of the Seventeenth Session.

The evening was devoted to the annual exhibit of photographs given by the Photographic Section. Mr. John R. Lee showed a collection of slides of Scottish Scenery and of groups of members of the Andersonian Naturalists, the latter slides having been made several decades ago by Mr. George Herriot. A series of new slides of Auchenreoch Glen, taken by Mr. W. Cannon were shown and commented upon by Miss Craig. Mr. R. H. Johnstone contributed a collection of coloured and monochrome slides of birds' nests and fungi respectively, both series being made from photographs taken by Mr. Baxter. The final contribution to a very enjoyable evening was a ciné-film, made and shown by Mr. Wm. Pettigrew, illustrating the delicacy of structure and transparent beauty of Amoeba, Protozoa, Rotifera and larvae crustacea.

11TH FEBRUARY, 1947.

The Annual Business Meeting of the Society took place, with Professor John Walton in the chair.

The following new member was admitted :—Mrs. Betty Syme, 41 Maxwell Avenue, Glasgow.

The reports of the activities of the Society were read and approved. The following new office-bearers were elected :—*Vice-Presidents*, Mr. John R. Lee and Dr. J. Inglis Cameron ; *Members of Council*, Mr. Robert McKechnie, Mr. Nicol Hopkins and Dr. Donald Patton. Mr. Ernest Stollery was appointed Editor of "Transactions" in place of Dr. Patton, who had tendered his resignation from office.

11TH MARCH, 1947.

Dr. J. Inglis Cameron, Vice-President, in the chair.

On this occasion, Dr. Blodwen Lloyd, senior lecturer in Botany and Bacteriology at the Royal Technical College, gave a most interesting lecture on "The Ciné Film and Biology."

Since the time when in the London of 1910, Percy Smith showed the first coloured film "Birth of a Flower" much had been accomplished by the Gaumont British Film Company and the Pasteur Institute towards the development of visual education in biology. The position of the scientific film in



other countries was commented upon also the national peculiarities of subject, technique and presentation. Two Soviet films of outstanding merit had been made—one dealing with seagulls and the other illustrating the activities of the hive bee—while Spain has specialised in agricultural films.

Dr. Lloyd showed some slides illustrating the making of films from the period of Percy Smith to the elaborate microforge technique used in the Pasteur Institute for the production of glass instruments used in the micro-manipulation of planktonic material while being filmed.

Three films were then shown, one a Canadian film on the care of ducks in a game preserve, a Percy Smith on the micro-organisms of a Filter Bed, and lastly a coloured film in Surrey on the management of bee-hives.

1ST APRIL, 1947.

The fourth meeting of the session was held with Mr. J. Duncan Leslie in the chair.

The lecturer, Mr. George McLean, F.R.M.S., took as his subject "Natural History in Criminal Investigation." Mr. McLean briefly outlined the early history of the City of Glasgow Police from the time when they were a company of 65 watchmen armed with four-foot staves up to the present highly organised force for crime prevention and detection. The developments of new techniques—the use of fingerprints and ear-shapes for identification, the determination of blood-stains and the "theory of exchange"—have all helped to give crime detection a more scientific basis.

The lecture was illustrated by screen projections of scenes of crimes, identification bureaux, micro-photographs of fibres, hair and wool; also microscope slides and specimens were shown of sands and gravels.

12TH MAY, 1947.

Mr. John R. Lee in the chair.

The following new members were admitted:—Mr. A. Cooper, 5 Haughburn Terrace, Nitshill, Glasgow; Mr. Thomas Hamilton, B.Sc., 10 Earnock Avenue, Motherwell; Mr. Hugh Medine, B.Sc., 3 Muslin Street, Glasgow; Miss Alison T. M. Wallace, M.A., 151 West Princes Street, Glasgow; Miss Violet M. McGowan, 21 West Princes Street, Glasgow.

Mr. Richard Elmhirst of the Marine Biological Station at Keppel, Millport, gave an illustrated talk on the Hermit.

Crab. He described the natural history of the Hermit Crab and the experiments conducted to ascertain the method by which the animal grips the whelk shell which it occupies and to study the commensal arrangement between the crab and the worm which is usually found occupying the same shell.

#### 9TH JUNE, 1947.

At the sixth meeting, chaired by Mr. Wm. Russell, one new member, Mr. Robert K. Munro, M.A., B.Sc., Briarbank, Newmilns, Ayrshire, was admitted to the Society.

The annual report by Mr. Thomas Robertson of the work of members of the Society and their friends in compiling a list of the First Arrivals of Summer Birds in the Clyde Area was given to the Society and was followed by the annual exhibition of botanical and geological specimens.

#### 14TH OCTOBER, 1947.

The President took the chair at this, the seventh, meeting of the session.

The new members admitted were:—Mr. Dugald Smith, M.P.S., F.S.M.C., 77 St. George's Road, Glasgow; Miss Elizabeth Stark, 173 Deanston Drive, Glasgow; Miss Lily Johnstone, 37 Winton Drive, Glasgow; Mr. Michael B. Brian, M.A., Dept. of Zoology, University of Glasgow; Mr. Andrew D. Brownlie, 7 Lothian Gardens, Glasgow, N.W.; Mr. Edward G. Hill, B.Sc., 27 Gordon Road, Glasgow, S.4.

The Presidential Address, entitled "Horsetails: Living and Extinct," gave a very fine summary of our knowledge of these interesting plants from palaeozoic times until the present day. Of the 25 or so species of these primitive plants now living, 9 species are found in Britain. The plants are whorl-like sterile stems and shorter fertile stems bearing scaly cones. The assimilation of materials for photosynthesis is carried out by the green branches and the stems. The upper part of the plants grow from branched underground stems which run horizontally through the soil and from the bases of which the true roots are produced. These underground stems may penetrate several feet below the surface making the plant very difficult to eradicate when once established. Small tubes, probably serving as reserve food stores, may be found growing on the shizames of several species. Reproduction in the Horsetails is similar to that in the Ferns. Large numbers of spores are produced in the cones and these, if they germinate in a suitable medium, grow into male and female prothalli. After fertilization, the resulting cell develops into the familiar Horsetail generation.

Many projected illustrations were shown of living and fossil specimens.

11TH NOVEMBER, 1947.

Professor John Walton in the chair.

One new member was admitted :—Miss Mary M. Maxwell, 26 Kirkwall Road, Cathcart.

Some notes were read by Mr. J. Boyd concerning Hawk Moths, Waxwings, and Badgers in the West Kilbride, Largs and Inverkip area.

The speaker for the evening, Mr. John R. Lee, is an acknowledged authority on Mosses, the subject of his lecture. He described the alternation of generations in the mosses, the detailed structure of the gametophyte and sporophyte generations, the methods of spore dispersal, the cytology of the mosses and the external appearance of many different species.

Members greatly appreciated this beautifully illustrated and expertly delivered review of a comparatively little-known subject.

9TH DECEMBER, 1947.

At the ninth, and last, meeting of the session one new member was admitted to the Society :—Rev. John B. Wanless, 7 Lower Bourtree Drive, Burnside. Miss Agnes Meikle at the commencement of her talk on "Some observations on Cordyceps," mentioned that much of the information known regarding this fungal disease of insects was due to the work of the late Mr. Armour, one-time student of the West of Scotland Agricultural College.

This fungal disease is closely allied to the Ergot of rye, and the particular species, *Cordyceps gracilis*, is specially associated with the Swift Moths.

The insects are generally attacked in the larvae stage. The fungus produces a stalked red fruiting head in which are developed a number of asci, each of which produces eight ascospores. The spores penetrate into the caterpillar and give rise to a ramification of mycelial tissue which eventually kills the insect. The fungus has now reached the moult stage and produces terminal gonidia, which are able to give rise to a new mycelium.



## OBITUARIES.

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### HUGH ALEXANDER BROWN.

By the death on Saturday, 11th May, 1946, of Mr. Hugh Alexander Brown, our Society loses one of its oldest members, and one who for over sixty years took a close and, so long as his health permitted, an active interest in all its work. As an original member of the old Andersonian Naturalists' Society, in his younger days he was a constant attender at its excursions, and until his removal from the city some years ago, he was seldom absent from our meetings. Advancing years having considerably reduced his physical powers, he went to stay with his daughter in Rothesay, from whence, however, he continued to keep in constant touch with the Society, and followed with the keenest interest whatever reports reached him, either through the pages of our publication, or in letters from members with whom it was his delight to correspond.

Mr. Brown was a native of Bonhill, Dumbartonshire. Born on 6th June, 1858, he started life in that wonderful transition period when men's minds were being agitated by the first shocks of the great Darwinian controversies—a time when it was good to be young and fresh and eager; and it is safe to assume that the new knowledge of the world in which he was later so keenly interested must have impressed his young mind from an early age. His primary schooling took place in the old parish school of Bonhill; and to the last he retained an affection for his native district, the Vale of Leven and the nearby Loch Lomondside being always favourite haunts.

From an early date his mind seems to have turned to Education as his chosen profession. Throughout most of his life he was resident in Glasgow, and he took his qualifying classes in the old Free Church Training College. But, although a resident citizen of this, our no mean city, his educational activities were in the neighbouring town of Paisley, where he was for some years a Departmental Master in Camphill School, and afterwards Headmaster first of Ferguslie and later of Abercorn schools. On his retiral in the Spring of 1923, he was prepared and happy to settle down quietly to a well-earned rest, and to the enjoyment of that leisure which should enable him to revel in the beauties of the world which had always appealed so strongly to him. Five years later, however, in response to the urgent pleadings of his son, Professor Walter Brown of the University of Hong Kong, he was induced to undertake a trip round the world—an adventure which afforded him in the retrospect the keenest delight during the later days of his long life. Accompanied by his son, who



was returning from a visit home on academic business, he travelled across Canada, visiting most of the places of historic and scenic interest—Quebec, Montreal, Toronto and Niagara, the wonders of the Canadian Rockies and the Pacific coast, thence across the great ocean to Japan, and calling at Shanghai on the way to Hong Kong. Here he spent some three months from October, 1928, to January, 1929; and then, taking leave of his son, he made his way home via Singapore, Colombo, Egypt, Palestine and the classic lands of the Mediterranean—a journey which he always spoke of as the great event of his life.

Mr. Brown was a lover of all natural beauty, and his interest in the world of wild things led him to associate himself with those kindred spirits to whom we owe the foundations of the Society whose activities have meant so much to all of us. Although he did not at any time devote himself specially to any one department of Natural History, he had a very considerable and accurate knowledge of many sections, and it was his particular aim to interest others in those studies which he felt had so much enrichment to impart to the mind. His connection with our Society arose solely through his membership of the Andersonian, with which, as already mentioned, he was connected from its foundation in 1885. To him, as to many others, the name “Andersonian” was symbolic of much that was fairest and best in life’s experience, and he was ever eager to speak of the happy days spent in our company.

But his interest was not by any means confined to either outdoor or indoor studies. In social life he made many friendships, and was known to a wide circle as a man of happy disposition, a cheery companion, and a wise and understanding friend. He took a prominent part in Church affairs, acting as Preses in the congregation of Greyfriars Church, with which he was actively connected for the greater part of his life. In common, then, with a large company of friends, our Society loses one whose memory will be ever green to those who have had the privilege of travelling beside him along the journey of life, and to the surviving members of his family—two sons and two daughters—we extend our sincere sympathy as we sadly remove his name from our membership roll.

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### WILLIAM McINTYRE.

By the passing, on 29th May, 1947, of Mr. William McIntyre our Society loses one of its active members, and one who, by

his infectious enthusiasm for the Society's work and welfare, by his gentle manner, his cheery smile and ever friendly disposition, had won for himself a warm place in the hearts of all his associates among us.

A native of Greenock, Mr. McIntyre was born on 18th December, 1875. At the age of fifteen years he commenced his apprenticeship as a Marine Engineer with Messrs. John G. Kincaird & Co., Limited, afterwards joining the British India Company, whom he served as an Engineer in the Far-East.

His sojourn for many years in Burma must have been full of interesting experiences, and doubtless helped to develop some of the kindly qualities of forbearance and understanding which were prominent features of his character; but we learned little of such details, for he was always reticent in speaking of himself, preferring ever to listen to what others had to say, rather than to intrude his thoughts or opinions into the conversation.

Retiring about twelve years ago, he settled in Rutherglen. He was wont to say that one of his regrets was that he had not known more of such activities as our Society afforded at an earlier age. He was attracted to the study of the natural sciences by attending the classes in the Royal Technical College, botany and geology being his special interests. He joined our Society as a member in 1941, and quickly became known as a regular attender of the Society's excursions. Always ready to help in any way, he was elected to the Council in 1943, and served in that capacity for the usual term of three years.

The last occasion on which he took part in our programme was at the holiday outing to the Trossachs on 26th May, 1947, just three days before his unexpected and sudden death. On that occasion he was to all appearance in his usual health and buoyancy of spirit, entering fully into the enjoyment of that very pleasant outing.

We shall miss his kindly presence, and look back with grateful memory to the many happy days he spent among us.

RICHARD PRASHER.

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### THOMAS NISBET.

Thomas Nisbet joined the membership of the Andersonian Naturalists' Society in 1901. At or about that time he was associated with the work of the late Professor G. F. Scott-

Elliot, who conducted the Botany classes then meeting in the old building of the Technical College on the site of which the present College in which our Society has its home was built.

A native of the East-end of our city, his work as an educationist was during a considerable part of his career associated with that part of Glasgow. Receiving his early schooling in Parkhead, where it is recorded that he showed promise of future distinction, he passed to the Training College of the Established Church, and later to the University, graduating in 1895 with first-class honours in Mathematics, and gained the Breadalbane Scholarship for Mathematical Research. For a time he was on the staff of the Pupil Teachers' Institute, and in 1910 was appointed an Assistant Visitor of Schools under the Glasgow Board. Later he was made headmaster of Kent Road School, and six years later, in 1922, he was promoted Head of Whitehill Higher Grade School, Dennistoun, in which, nearly thirty years earlier, he had begun his career as a teacher, serving for a few months on its staff. Here he remained in charge of this important and famous school for nine years, until his retirement in March, 1931, when he removed to Helensburgh where his death took place on the last day of 1946.

Mr. Nisbet's connection with the Andersonian Society, and later with the combined Society, was no mere formality. He was keenly and actively interested in the work of the Society, being for four years (1903 to 1906) one of the honorary secretaries, and later called to the chair as President during 1919-1920. His interest was chiefly, though not exclusively, botanical; and his work in this department was always characterised by an accuracy in observation and careful attention to detail which were recognisable features in his personal life. He was particularly fond of the district of Loch Goil, where for many years he was in the habit of spending his summer vacation and made a special study of the vegetation, particularly the alpine and sub-alpine flora of the mountains surrounding Lochgoilhead. His association with this region is permanently commemorated by a valuable paper on the "Phanerogams and Ferns of South Ardgail," read to the Andersonian Society in November, 1910, and published in its "Annals" (vol. IV., pp. 1-33). This paper contains much information about the occurrence of mountain-loving species in this interesting part of our area, as well as valuable notes on the topography of the district. The subject was still further elaborated in its ecological aspects by Mr. Nisbet in another paper which appeared shortly afterwards in the pages of the "Scottish Geographical Magazine," September, 1911



(vol. XXVII., pp. 449-466) under the title of "The Plant-geography of Ardgoil."

As regards Mr. Nisbet's characteristics as a man, one cannot do better than quote here in full some remarks made about him by one of his associates at Whitehill School in a recent publication issued on the occasion of that school's jubilee :—

"Method and exactness are characteristic of Mr. Nisbet and there was a quietness and repose about his teaching of mathematics that was most effective, especially with such as were not natural mathematicians! The same qualities marked his reign in Whitehill from 1922 to 1931. One might judge him to be rather retiring and aloof in manner as he moved about the school, but in reality he was in touch with the work and knew when to intervene and when to let well alone. A somewhat serious expression of face concealed a good sense of humour which not infrequently revealed itself. The school seemed to go on automatically, but behind the scenes much was being done for us of which we were hardly aware."

This summary of Mr. Nisbet's character will be heartily endorsed by every one who has been privileged to enjoy the friendship and to be associated with the work of one who must be accorded a place in the front rank of those whose names have adorned our Society's Roll.

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### GEORGE LUNAM,

DIED 1ST JUNE, 1947.

Mr. George Lunam joined the Natural History Society of Glasgow on the 26th May, 1908, and at once took a leading part in its activities. He served for many years on its Council. In 1914 he became Joint Hon. Secretary of the Society with Mr. Alexander Ross. He occupied the office of Vice-President for two terms, from 1925 and from 1939.

The branch of science in which he specialised was the Fresh-water Algae. In this work he was associated with Mr. Robert Garry, both of whom were responsible for the addition of a large number of new plant records. In his paper on "Some Additions to the Fresh-water Algae of the Clyde Area" (Glasgow Naturalist Vol. I., 1910), Mr. Lunam recorded some of his finds.



A frequent exhibitor at the Society meetings, Mr. Lunam brought specimens from many and varied localities :—from the Outer Hebrides to the Channel Islands ; from the sand dunes of Culbin to the sandy shores of Fife.

One area he loved, perhaps better than the Western Isles (perhaps not) was Lawers. He became one of that party of botanists to whom Ben Lawers was a Mecca and with them he made the annual pilgrimage. Few knew the mountain so well as he—as a botanist, a photographer and as an angler.

On several occasions, too, Mr. Lunam contributed to the Society's Annual Photographic Exhibition, a series of lantern slides illustrating the plants and the scenery so dear to him. He also conducted several of the Society's excursions. For one period (from 1928) he acted as one of our auditors.

He did similar work for the Andersonian Naturalists' Society, his chief contribution being a paper on "The Main Line of Descent through the Green Algae"—Ann. And. Nat. Soc. Vol. IV., pt. 1.

Mr. Lunam was a member of the teaching profession and, before he retired, was a science master in Whitehill Secondary School. There he strove for the inclusion of the Natural Sciences in the Secondary School curriculum. His laboratory differed from the others in the school, for he kept aquaria going throughout the year, and a display of wild flowers which he changed with the seasons.

During the last few years, illness prevented Mr. Lunam from taking an active part in the work of the Society, but he maintained his interest in its activities, and found great pleasure in recalling his early association with Glasgow's naturalists.

In all his work in Biology and for the Society he was assisted and encouraged by his wife who, prior to their marriage, was an enthusiastic worker in the Andersonian Naturalists' Society. To her and to their son we would express our sincere sympathy in their bereavement.

Mr. Lunam was a pleasant companion and a valuable friend. His friendship and helpfulness will be greatly missed by many in this Society especially by those who used to foregather at Lawers.—DONALD PATTON.

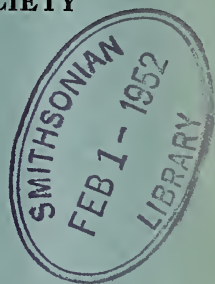
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# The Glasgow :: Naturalist

*The JOURNAL of the*  
GLASGOW AND ANDERSONIAN NATURAL  
HISTORY AND MICROSCOPICAL SOCIETY

including the  
*Transactions and Proceedings*  
of the Society



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## CONTENTS

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|  | PAGES |
|--|-------|
| NOTE ON THE OCCURRENCE OF <i>HIATELLA</i> IN THE<br>CLYDE SEA AREA— <i>W. Russell Hunter</i> ... | 37    |
| LIST OF FIRST ARRIVALS OF SUMMER BIRDS IN CLYDE<br>AREA— <i>Compiled by Thomas Robertson</i> ... | 38    |
| REPORT OF DELEGATE TO BRITISH ASSOCIATION<br>MEETING ... ..                                      | 41    |
| EXCURSION REPORTS ... ..   | 41    |
| SECTIONAL REPORTS ... ..   | 48    |
| REPORTS OF SOCIETY MEETINGS ... ..   | 53    |
| OBITUARIES ... ..  | 58    |

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## THE OCCURRENCE OF *HIATELLA* IN THE CLYDE SEA AREA.

According to most fauna lists and other accounts, *Hiatella arctica* (*Saxicava rugosa*), the rock-boring lamellibranch, is found excavating only in limestone. During the years 1945-48, it has been found boring in a range of sandstones of Carboniferous and Old Red Sandstone age in the Clyde Sea Area. It is not limited to acid-soluble rocks, but apparently does not bore in sandstones of coarse grain (approximate grain size greater than 0.16 mm. diameter). In the adult its boring is completely mechanical: increase of water pressure in the mantle cavity provides, by distension of the basal part of the siphons, a fixed point about which movements can take place, and also furnishes the pressure of the shell valves against the walls of the burrow which is required for abrasion. It will not bore in very hard rocks or in those of conglomerate type, *i.e.* those with pebbly inclusions. *Pholas* spp. also seem to be limited to relatively soft and homogenous rocks, although *Pholas* is found in very soft materials (*e.g.* clays and peats) which are not bored by *Hiatella*. *Pholas* also seems to be tolerant of a greater grain size, but even it does not bore in sandstones with grain size larger than approximately 0.5mm. diameter. In the Clyde Sea Area the burrows of *Hiatella* and *Pholas* seem to be confined to the rocks below Low Water Mark, Neap Tides.—W. RUSSELL HUNTER.



# LIST OF FIRST ARRIVALS OF SUMMER BIRDS IN CLYDE AREA IN 1948, COMPILED FROM RE- PORTS OF MEMBERS AND FRIENDS

BY THOMAS ROBERTSON

| <i>Bird</i>                          | <i>Date</i>                              | <i>Locality</i>  | <i>Av. Date<br/>over<br/>55 years</i> | <i>Earliest<br/>Date, 1947</i> |
|--------------------------------------|--|--|---------------------------------------|--------------------------------|
| <b>Lesser Black-<br/>Backed Gull</b> | Mar. 8<br>Mar. 16<br>Mar. 18             | Glasgow Harbour<br>Southend, Kintyre<br>Largs                  | Mar. 11                               | Mar. 9                         |
| <b>Chiffchaff</b> ...                | Mar. 25<br>Mar. 30<br>April 2<br>April 2 | Largs<br>Southend, Kintyre<br>Dalry<br>Pollok Park,<br>Glasgow | April 8                               | Mar. 28                        |
| <b>Willow Wren</b> ...               | Mar. 27<br>April 10<br>April 11          | Kilmarnock<br>Richmond Park,<br>Glasgow<br>Motherwell          | April 12                              | April 12                       |
| <b>Wheatear</b> ...                  | Mar. 28<br>April 3<br>April 4            | Southend, Kintyre<br>Largs<br>Cardross                         | Mar. 25                               | Mar. 23                        |
| <b>White Wagtail</b> ...             | April 1<br>April 13<br>April 17          | Largs<br>Richmond Park,<br>Glasgow<br>Torrance                 | April 4                               | April 10                       |
| <b>Sand Martin</b>                   | April 9<br>April 14<br>April 15          | Motherwell<br>Dumbarton<br>Largs                               | April 9                               | Mar. 31                        |
| <b>Swallow</b> ...                   | April 10<br>April 12<br>April 15         | Southend, Kintyre<br>Dumbarton<br>Dalry                        | April 10                              | April 12                       |
| <b>Terns (Common<br/>and Arctic)</b> | April 14<br>May 7<br>May 8               | Summerston<br>Southend, Kintyre<br>Motherwell                  | May 8                                 | April 23                       |

| <i>Bird</i>                   | <i>Date</i>                                     | <i>Locality</i>  | <i>Av. Date<br/>over<br/>55 years</i> | <i>Earliest<br/>Date, 1947</i> |
|-------------------------------|---|--|---------------------------------------|--------------------------------|
| <b>Tree Pipit</b> ...         | April 14<br>April 22<br>April 24                | Drumpellier,<br>Coatbridge<br>Darvel<br>Balloch                          | April 23                              | April 26                       |
| <b>Cuckoo</b> ... ..          | April 16<br>April 17<br>April 20                | Kilmarnock<br>Dalry<br>Southend, Kintyre                                 | April 22                              | April 24                       |
| <b>Corncrake</b>              | April 18<br>April 24<br>April 29                | Southend, Kintyre<br>Darvel<br>Motherwell                                | April 25                              | April 28                       |
| <b>Common<br/>Sandpiper</b>   | April 19<br>April 20<br>April 20<br>April 20    | Kilmarnock<br>Bothwell Bridge<br>Largs<br>Southend, Kintyre              | April 13                              | April 13                       |
| <b>House Martin</b>           | April 20<br>April 23<br>April 24                | Largs<br>Milliken Park<br>Kilmarnock                                     | April 21                              | April 25                       |
| <b>Redstart</b>               | April 23  | Richmond Park<br>Glasgow   | April 26                              | April 24                       |
| <b>Yellow Wagtail</b>         | April 23<br>April 29                            | Kilmarnock<br>Motherwell   | April 21                              | April 26                       |
| <b>Common<br/>Whitethroat</b> | April 24<br>April 30<br>May 2<br>May 2<br>May 2 | Darnley Glen<br>Southend, Kintyre<br>Darvel<br>Mearnskirik<br>Motherwell | May 2                                 | May 5                          |
| <b>Sedge Warbler</b> ...      | April 25<br>April 29<br>May 3<br>May 3          | Coatbridge<br>Kilmarnock<br>Lochwinnoch<br>Possil Marsh                  | May 2                                 | May 2                          |
| <b>Whinchat</b> ...           | April 30<br>May 3<br>May 3<br>May 3             | Southend, Kintyre<br>Kilmarnock<br>Largs<br>Loch Thom                    | April 28                              | April 27                       |
| <b>Swift</b> ... ..           | May 3<br>May 5<br>May 7                         | Largs<br>Bothwell Bridge<br>Kilmacolm                                    | May 2                                 | April 26                       |
| <b>Wood Wren</b> ...          | May 8   | Skelmorlie   | May 3                                 | May 7                          |

| <i>Bird</i>                        | <i>Date</i>                | <i>Locality</i>                              | <i>Av. Date<br/>over<br/>55 years</i> | <i>Earliest<br/>Date, 1947</i> |
|------------------------------------|----------------------------|--|---------------------------------------|--------------------------------|
| <b>Garden Warbler</b>              | May 9<br>May 10<br>May 11  | Kilmarnock<br>Lochwinnoch<br>Bothwell Bridge | May 9                                 | May 9                          |
| <b>Grasshopper<br/>Warbler ...</b> | May 12                     | Lochwinnoch                                  | May 5                                 | May 12                         |
| <b>Spotted<br/>Flycatcher ...</b>  | May 14<br>May 15<br>May 16 | Fairlie<br>Kilmarnock<br>Darvel              | May 11                                | May 10                         |
| <b>Blackcap ...</b>                | May 15<br>May 15           | Braidwood<br>Darvel                          | May 11                                | No record                      |

## REPORT OF DELEGATE

to the British Association Meeting, Brighton, 1948.

Mr. John Boyd submitted his report.

Two meetings of the Conference of Delegates of Corresponding Societies were held. The first consisted of a Presidential Address on "The Corresponding Societies and the Communities they Serve." This was followed by a short discussion on ways and means of increasing local interest in the objects of such Societies. The second meeting took the form of a *conversazione* in the Museum, where an attractive exhibition dealing with natural history, archaeology and microscopy was laid out.

Mr. Boyd gave a general account of other lectures and functions he had attended.

## EXCURSION TO DUNURE,

29TH MARCH, 1948.

The Party proceeded from Dunure Bus Terminus to the Castle, where Mr. McCrindle gave a short but interesting and informative talk on the history and traditions of the Castle. He related the rather gruesome tale of the roasting of the Abbot (a tale which seems not to be confined to Dunure Castle) and also pointed out the three different sections built at varying periods. An interesting fact mentioned by him was that a friend of his who had had some archaeological experience of the battlements of Jerusalem, had stated, on examination of Dunure Castle, that the builders of Dunure had either gone from Dunure to Jerusalem or vice-versa. Among many other interesting stories told is one that Pilate, the Roman Governor, landed and spent some time there. A portion of a broken arch, evidently blown up by gunpowder, was noted, on which the mortar was as hard as, if not harder than the stone.

Past the Castle, the profile of the sphinx was observed on the weathered rock. The weather was windy with a tendency to rain, giving little comfort on the cliff tops. It was more sheltered on the shore, where a nook was selected by the party, and while lunching, several mature and immature gulls, Lesser Black Backed, Common and Blackheaded, were seen along with several Gannets and one or two Shag. On the descent



to the shore, Lesser Celandine (*Ranunculus Ficaria* L.), Sloe (*Prunus spinosa* L.), Scurvy Grass (*Cochlearia officinalis* L.) were seen in flower.

Half a mile or so along the shore, the egg cases of a large spider were found in a cave and not far beyond that the site of a raven's nest was seen high up on the face of the cliff. Several oyster-catchers were the only birds seen from the beach. On the ascent to the cliff top, plants seen in flower were Primrose (*Primula vulgaris* Huds.), Red Campion (*Lychnis Diurna* Sibth.), Common Golden Saxifrage (*Chrysosplenium oppositifolium* L.), Gorse (*Ulex europaeus* L.) and Coltsfoot (*Tussilago Farfara* L.).

One species of insect, a Bristletail (*Petrobius maritimus*) was very abundant—some of the rocks being alive with it.

The party then proceeded to the road and thence to Dunure.

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## EXCURSION—BISHOPTON TO LANGBANK,

1ST MAY, 1948.

Eighteen persons took part in this outing, travelling by train to Bishopton from Central Station at 1.30, p.m. thence by the hill road (south) to Langbank, returning from there by train.

With the exception of a heavy shower of rain, encountered about half way and lasting only for about ten minutes, the afternoon was fine; and although somewhat heavy mist obscured some of the more distant mountains, the party enjoyed the excellent views obtainable from the road as it approaches Langbank. For a considerable distance the way lies along fairly high ground overlooking the Clyde at one of its most picturesque points, with the Rock of Dumbarton forming a beautiful centre-point. The massive form of Ben Lomond gives the middle part of a wonderful background of mountain scenery, which makes this road one of the most delightful in this part of the country.

A number of private plantations along the roadside furnished the botanists of the party with some interesting specimens of both native and introduced trees, many of which were seen in their appropriate freshness as if in special honour of May-day. At Bishopton station a species of *Berberis*, unfamiliar to the party, was observed in full bloom. Its flowers resembled those of the well-known *Berberis Darwinii*, but comparison with an undoubted specimen of the latter just a short distance

away showed it to be quite different both in habit and foliage. The blossom of the Gean (*Prunus avium*) was everywhere abundant, and trees of the Hagberry (*Prunus Padus*) were noted in bud. The Sycamore, or Great Maple (*Acer Pseudo-platanus*) was in full flower all along the road ; and at one point its near ally, the Norway Maple (*Acer platanoides*), was noted in fine bloom. Near Langbank a small tree growing in a private plantation close to the roadside caused a certain amount of discussion, none of the party being able to identify its species ; it has since been recognised as the Bladder-nut (*Staphylea pinnata*), an alien species uncommon in this country.

A fair variety of our common plants was observed, conspicuous among them being the "Wee Toun Clock" or Moschatel (*Adoxa Moschatellina*) which was unusually abundant. Some plants of this species were seen to be affected by a micro-fungus identified by Professor Braid as *Puccinia adoxae*. I am indebted also to Professor Braid for a further observation of another micro-fungus which was found on the Lesser Celandine in some quantity. This, he says, is a common fungus, but in this case some of the teleutospores differed from the normal form in being double-celled—single-celled spores being characteristic of this species. The fungus is called *Uromyces ficariae*.

Among other plants by the roadside were noted the two species of Stitchwort (*Stellaria Holostea* and *S. nemorum*), the Sandwort (*Arenaria trinervia*), Wood Violet (*Viola sylvatica*) and Wood Sorrel (*Oxalis Acetosella*), the last in great abundance. Others less common were the Garlic-mustard (*Sisymbrium Alliaria*) and Whitlow-grass (*Erophila verna*). In a dolerite quarry by the roadside, a plant not in flower noted by Mr. Prasher, was probably *Potentilla norvegica* ; its identity could not be verified however.

In the same quarry one or two mosses were observed, among which the beautiful *Bryum alpinum* (one of the handsomest plants of its genus) was conspicuous. But the prize of the excursion seems to have gone to Mr. Boyd, who, while searching the rocks near the quarry, found a specimen of *Andreaea* which seems to answer to the descriptions given of the rare *A. crassinervia*—a species not hitherto recorded for Renfrewshire, and one which is only found in a few alpine and sub-alpine localities in this country. It is, however, a species regarded as doubtful by some authorities, as it approaches closely in its characters to some forms of the variable *A. Rothii*—a much more common moss, and one which occurs fairly abundantly on the hills to the south of our locality. The specimen has been sent for confirmation (or otherwise) to Mr. J. B. Duncan, whose reply has not yet come to hand.—JOHN R. LEE.

## EXCURSION TO AUCHINCRAIVE, by AYR,

24TH MAY, 1948.

Through the courtesy of the Governors of the West of Scotland Agricultural College, a party of 13 visited Auchincraive on Monday, 24th May, 1948.

The Soil Laboratories were demonstrated by the Soil Chemist, Dr. C. L. Whittles, who illustrated how soils, sent in for analysis, were dealt with. The Farm Manager, Mr. J. M. Thomson, conducted the visitors over the dairy, byre, piggeries and silage plant.

At the Plant Pathology Department, Dr. J. Grainger described the work of the station, exhibited some common types of diseases and illustrated the relationship of disease with climatic factors. Dr. H. F. Dovaston referred to his work on *Helminthosporium* disease of ryegrass and demonstrated some of his alpine plants, alive and by photograph. Amongst others he demonstrated living plants of the continental or true *Carex vulpina* from Kent; *Carex ericetorum* from Yorkshire; *Draba rupestris*, *Potentilla rupestris*, *Myosotis alpestris*, *Luzula spicata*, *Juncus trifidus*, *Saxifraga nivalis*, *Asplenium Breynei* (*germanicum*), *Woodsia alpina*, *Ceterach officinarum*. In one interesting series were plants of *Primula farinosa* from Yorkshire, *P. scotica* from Caithness and a still more diminutive form from Orkney. Each of the latter was smaller than *P. farinosa*, which has an "unreduced" chromosome number of 18 against the 54 and 72 for *P. scotica*. He mentioned that a smaller and more difficult plant to grow in cultivation (and this increased with decrease in size) is *P. stricta*, a Greenland species with 126 chromosomes. *Ophioglossum lusitanicum* has one of the highest known chromosome numbers (1,024), and photographs of this plant were exhibited.

Mr. D. F. Booth gave an interesting demonstration of the work being done in the study of the behaviour of frost and the methods adopted to lessen the incidence of frost damage to fruit.

Thereafter, under ideal weather conditions, the party toured the road-sides, river-bank, gardens, policies and woods. The most noteworthy trees and shrubs were:—The Sweet Buckeye Chestnut (*Aesculus octandra*—*A. flava*); Flowering or Manah Ash (*Fraxinus ornus*); Spindle Tree (*Euonymus europaeus*); Salmon Flowered Laburnum (*Laburnum Adami*). All of these were in full flower and in the last the three distinct flowers of the graft hybrid were easily discernible. *Ginkgo*, the Cut Leaved Beech (*Fagus sylvatica* var. *heterophylla*) and *Paulownia imperialis* were only coming into leaf.



Of the flowering plants seen, mention can be made of :— the Bird's Nest Orchid (*Neottia Nidus-avis*), the three comfrees and also the Prickly Comfrey (*Symphytum asperrimum*), Hairy Perennial Oat Grass (*Avena pubescens*), Golden Oat (*Avena flavescens*), Quaking Grass (*Briza media*). Many interesting birds and butterflies were watched and the song of the Warbler listened to with enjoyment.—K. W. Braid.

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## EXCURSION TO SCOTTISH MARINE BIOLOGICAL STATION, MILLPORT,

SATURDAY, 5TH JUNE, 1948.

Fourteen members attended this excursion, the weather conditions being warm and sunny with a fresh easterly wind blowing inshore.

On arrival at the marine station, Mr. Elmhirst welcomed the company, and guided them to a room where a very fine display of marine algae was laid out for exhibition.

While the members were busy looking over the exhibits, Mr. Elmhirst, in his usual hospitable manner, had tea prepared, which was thoroughly enjoyed by the members, as no doubt the sea air had given the company a special appetite.

Mr. Elmhirst was cordially thanked for his hospitality, and thereafter the company spent the remainder of the afternoon chiefly botanising on the sand dunes and the marsh adjoining the marine station.

A considerable amount of botanical material was collected, the most noteworthy being *Apium inundatum*, Reichb, *Menyanthes trifoliata*, L., *Orchis maculata*, L. *Orchis praetermissa*, Dr. and *Ornithogalum umbellatum*, L.—RICHARD PRASHER.

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## EXCURSION TO CALDER GLEN, LOCHWINNOCH,

3RD JULY, 1948.

The weather on this afternoon was very unfavourable, a heavy drizzle prevailing throughout most of the time. Nevertheless, four of our members travelled to Lochwinnoch and visited the glen in spite of the rather miserable conditions, and although, owing mainly to the sodden nature of the ground the walk had to be curtailed to a considerable extent, there was sufficient of interest to make the afternoon's outing quite an enjoyable one.



The wet weather had the effect of swelling the river to a heavy flood, so that members enjoyed the fine spectacle of the waterfall near the foot of the glen, and the cascades farther up stream, a sight well worth seeing.

The glen was approached by Bridgend, a slightly roundabout route taken in order to pass over the old bridge, one of the antiquities of the district. At this point, attention was called to a specimen of the wayfaring tree (*Viburnum Lantana* L.). On entering the glen itself it was found necessary to keep strictly to the well trodden path, owing to the state of the ground, the result being that little could be done in the way of searching for the more interesting features known to most of the members. In spite of this, however, a number of plants were noted, the most interesting of which were the tuberous Vetchling (*Lathyrus macrorrhizus* Wimm.), Hemlock Water Dropwort (*Oenanthe crocata* L.), two species of Valerian (*Valeriana officinalis* L. and *V. pyrenaica* L.), Marsh Hawk-beard (*Crepis paludosa* Moench.), Golden-rod (*Solidago Virgaurea*, L.), and the beautiful Woodland Sedge (*Carex sylvatica* Huds.). Three interesting grasses were also noted—*Poa nemoralis* L., *Melica uniflora*, Retz, and *Milium effusum* L.). and the Beech and Hard Ferns (*Phegopteris polypoides* Fee, and *Blechnum boreale* Sw.) were observed in numbers.

Returning to the village, the members of the party partook of a welcome tea, after which a short walk was taken to Castle Semple Loch before entraining for Glasgow.

RICHARD PRASHER.

## EXCURSION TO PORTINCROSS.

7TH AUGUST, 1948.

Six members turned up at West Kilbride on the above date, but a dull sky with an easterly drizzle caused us to abandon our original plan and make for the Kirkton Glen instead.

Here, in the Kilbride Burn, large masses of the River Crowfoot (*Ranunculus fluitans*, Lam.) attracted attention, as did a solitary specimen of *Inocybe geophylla*, (Sow.) Fr., which, along with *Stereum hirsutum*, (Willd) Fr., constituted the sole mycological finds in the day's outing.

Further down the Glen, interest became centred on the grasses, *Poa nemoralis* L., living up to its specific name by growing profusely on the woodland banks in marked contrast to its more usual habitat hereabout of the wall top.

An abortive digression up a nearby lane with the Soft Knotted Trefoil as objective, resulted, however, in the finding of the Field Madder (*Sherardia arvensis*, L.), the Wall Rue (*Asplenium Ruta-muraria*, L.) and some immature specimens of the Hart's-tongue Fern (*Scolopendrium vulgare*, Sm.).

Clearing skies tempted us to make for the shore at Seamill and this we followed to Portincross. The springy turf underfoot and a fresh, east wind above, made walking a pleasure, and opportunity was taken to note the difference between the Marram (*Ammophila arundinacea*, Host.) and Lyme Grass (*Elymus arenarius*, L.) which both occurred in abundance on the sand-dunes.

Between these and the golf course were the usual assemblage of heathy plants found inland with, in addition, such maritime species as Isle of Man Cabbage (*Brassica monensis*, Br.), Stork's-bill (*Erodium cicutarium*, L'Herit.) and the Sand Sedge (*Carex arenaria*, L.). In a similar situation in front of a house were found a dozen specimens of the Creeping Bell-flower (*Campanula rapunculoides*, L.).

Some of the party preferred to walk on the sands, watching the different kinds of gulls, the wheeling flocks of Ringed Plovers, and the more stationary Sheld-ducks and Oyster-catchers.

Of interest also were the numerous jellyfish left stranded by the receding tide, while items of geological interest were the tilted beds of old red sandstone conglomerate and the erratic boulders. The musical sands apparently were not performing as we passed by.

Further on among the shingle were found the Sea-radish (*Raphanus maritimus*, Sm.) and the sea variety of the Mayweed (*Matricaria inodora*, L., var. *maritima*, L.).

Arrived at the trap dyke, we rediscovered all our old friends—the Bloody Cranes-bill (*Geranium sanguineum*, L.), Sea Campion (*Silene maritima*, With.), Parsley Water-dropwort (*Oenanthe Lachenalii*, Gmel.), Lovage (*Ligusticum scoticum*, L.) and Crow Garlic (*Allium vineale*, L.).

Here, Mr. Prasher found a specimen of the Six-spot Burnet Moth (*Zygaena filipendulae*, L.) which the "Fauna, Flora and Geology of the Clyde Area" does not record as occurring on the mainland north of Shewalton.

While visiting the Castle, Mr. Prasher also reported two specimens of the Swine's-cress (*Senebiera Coronopus*, Poir.) still there.

On the return journey, we noted the Sea Buckthorn (*Hippophae rhamnoides*, L.) and acting on prior instructions from

Dr. Cairnie of Largs, we visited the entrance of a lane leading up to one of the houses, where we found a small colony of the rose-flushed flowers of *Allium carinatum*, L., a welcome extension in range of this rather rare plant which now appears to be spreading up the Ayrshire coast.

Returning to West Kilbride by the road, a comatose specimen of a Green-veined White was found—the only butterfly seen on the excursion.

Swallows and Swifts were observed to be still on the wing and the Corn Bunting and Yellow-hammer were in feeble song.

The only other items calling for comment were the Evergreen Alkanet (*Anchusa sempervirens*, L.), in its old haunt, and on the roadside wall opposite, the Black Spleenwort (*Asplenium Adiantum-nigrum*, L.).

On arriving at West Kilbride, a welcome cup of tea and good travelling facilities back to our respective homes rounded off another most enjoyable afternoon.—JOHN BOYD.

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## Sectional Reports.

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### BOTANICAL SECTION.

#### REPORT FOR THE YEAR 1948.

During the year the work of the Botanical Section has been well maintained, although little outstanding falls to be recorded. Members of the Society continue to show their interest in the out-door observations of plant life, as is evinced by the attendance at the sectional excursions, of which 15 were projected by the committee. Of these, however, the last one—on 21st August—had to be abandoned on account of the weather.

At the other fourteen outings there was an average attendance of ten—the highest figure being sixteen and the lowest five, this latter occurring on two occasions. The first excursion was to an old favourite locality—Torrance Glen, near East Kilbride, a place now sadly altered from its former well-kept condition in pre-war days, but still attractive even in its present neglected state. This was visited on 20th March, the early date being chosen for the benefit of the bryologists, this being a notable locality for several of the less common species of moss. Of these, *Tetraphis Browniana* Grev. was found on the rocks on the eastern side of the Rotten Calder at a point where that stream is joined by a smaller tributary near the southern end of the estate of Torrance. A search, unsuccessful



however, was also made for the much rarer *Campylostelium saxicola* B. & S., recorded many years ago from the same locality by the late Robert Grierson. On this occasion the members were entertained to tea in the mansion-house by the authorities of the new East Kilbride Planning Committee, from whom came the welcome intelligence that their intention was to preserve the glen in its natural state as part of the plan for the new town. The thanks of the members for this hospitable entertainment were expressed by Mr. John R. Lee.

A delightful Spring outing followed on 10th April, when nine members travelled to Bowling, with the intention of visiting the woods of Glenarbuck. Owing to a misunderstanding, however, the venue was changed, and the party proceeded instead by the very attractive road over the Kilpatrick Hills to Loch Humphrey. On the way up some very fine views of the lower reaches of the Clyde Valley were obtained, the weather being fine throughout the afternoon. Though the date was an early one many spring flowers were in evidence, twenty-seven species being noted in bloom, the most notable being the Lamb's Lettuce (*Valerianella olitoria* Moench).

A week later, on 17th April, eleven members visited Largs. Under the expert guidance of Mr. Boyd a very enjoyable afternoon was spent, the party travelling from Largs to Meigle and returning on foot by what is known locally as the "red road," which runs along the side of the hill parallel with the shore road, and from its elevation affords beautiful views of the Firth as well as providing the botanists with ample material for observations by its well wooded character. Thirty-two species of flowering plants were noted in bloom, among them the Wood Stitchwort (*Stellaria nemorum* L.) which seems here, as elsewhere throughout the Clyde area, to be on the increase.

Another old favourite locality, Darnley Glen, was visited on 24th April, when fourteen members attended. This is too well known to call for any detailed remarks, but it may be noted that the familiar bed of White Butterbur near the entrance to the glen seems to be spreading rapidly.

A fortnight later, on 8th May, the largest attendance (sixteen) made a trip to Shielhill Glen, near Inverkip. On this occasion the afternoon was warm and sunny, and the members enjoyed a successful outing, going via the "Roman Bridge" to the northern end of the glen to visit the hermit's cave, and returning through Inverkip Glen. Seventy-two species of flowering plants were seen in bloom, amongst them a notable "find" was a remarkable abundance of the rare *Draba muralis* L. This plant formerly grew on a roadside near Skelmorlie, and has been known in the vicinity of Kilmacolm



for many years, in both localities only a few plants have usually been seen ; here—a new Renfrewshire station—it was found to be abundant. Other plants of interest noted were Thale-cress (*Sisymbrium Thalianum* Hook.), Garlic Mustard (*Sisymbrium Alliaria* Scop.), Evergreen Alkanet (*Anchusa sempervirens* L.), *Saxifraga Geum* L., *Veronica montana* L. and *Carex pendula* Huds. The graceful Melic-grass (*Melica uniflora* Retz) was also found in abundance in the glen.

Crossford was visited on 15th May by nine members on a very warm and sunny afternoon. A pleasant walk through the orchards to the village was taken, the return journey being via the main road. The show of fruit blossom was somewhat disappointing—a result of early frost, coupled with an unusually severe visitation by insect pests. Plants of *Ranunculus auricomus* L. were noted, and the Ever-green Alkanet was also seen ; the most outstanding “ find ” of the day being, however, the Star-of-Bethlehem (*Ornithogalum umbellatum*, L.).

A visit to the Mearns lochs on 29th May attracted twelve members who circled the shores of the Little Loch, noting the many rare species which are to be found more or less abundantly around its margins ; thereafter the Brother Loch was visited. Some fifty species of flowering plants were noted, among them the two rare sedges formerly seen at this locality—*Carex limosa* L. and *Carex teretiuscula* Good. A fair show of the flowers of the Bog-bean (*Menyanthes trifoliata* L.) was seen, and particularly the dainty blossoms of the Cranberry delighted the members of the party.

Eight members visited Cumbernauld by bus on 12th June in order to see the blossoms of the Chickweed-Wintergreen (*Trientalis europaea* L.) which was found in abundance and in fine condition in its well-known station about a mile to the east. At this date the rich flora of the district was at its best, fifty species of flowering plants being noted by the wayside.

A disappointment awaited the five members who took part in the first of two evening excursions held in the month of June. On this occasion, Wednesday, 16th June, it had been intended to re-visit a favourite haunt of pre-war days—the south bank of the Clyde above Cambuslang. Making their way by the old “ right of way ” to the river-bank opposite Carmyle, the party found the right of way unexpectedly blocked, with a notice-board intimating that the road was “ temporarily closed ” owing to alterations at the Clyde Valley Electric Power Station. They were compelled to retrace their steps, and had to confine their attention to the fields between Cambuslang and the Clyde, and the bank of the river above the bridge. Some eighty species were noted in

flower. One feature was an unusual abundance of the Corn-violet (*Viola arvensis* Murr.) on some derelict ground near the power station. *Lamium incisum* Willd., was noted in its old station beside the right of way; and the Bitter-sweet Nightshade (*Solanum Dulcamara* L.) was also seen. Plants of the Bulbous Crowfoot (*Ranunculus bulbosus* L.) were noted growing in its classic station on the riverbank.

Six members took part in the outing to Blackwood, which had been arranged for the 19th June. As formerly, this outing had been carefully prepared for by the kindness of our friend Mr. Wm. Scott of Blackwood who had as usual secured for the entertainment of our party the services of the local Boy Scouts, that we might enjoy the treat of an "al fresco" tea in the open air. On arrival the party was joined by twelve local friends and proceeded to ramble through the Blackwood Estate. Unfortunately, they had not gone very far when a deluge of rain commenced, and the afternoon turned out one of the most inclement we have experienced for some years. The resulting conditions were such as to preclude much field work, but the botanical interest of the locality may be indicated by the fact that the list of plants observed includes over a hundred species. Among them may be specially mentioned the Lords and Ladies (*Arum maculatum* L.).

The second evening excursion was on Wednesday, 23rd June, when nine members visited Milngavie for a walk along the banks of the Allander. Some time was spent examining the introduced shrubs which have for so long formed a feature of the locality, and a visit was then paid to the well-known station of the Cranberry on the north side of the Allander, at which point a considerable quantity of the Sundew (*Drosera rotundifolia* L.) was noted. Other plants were *Carex acuta* L. and *Scirpus sylvaticus* L.

Saturday afternoon, 25th June, was selected as a suitable date for a visit to Loch Libo—a locality which never loses its charm for the botanists of our society. Among the many beauty spots of Renfrewshire there is perhaps no more charming corner than this lovely little loch at the southern end of the Fereneze Braes; and its scenic attractions are equally matched by its interest for the naturalist, whether his particular hobby be the observance of birds, insects, flowers, mosses, or aquatic life—macroscopic or microscopic. Unfortunately, the morning was dull and somewhat threatening, which probably accounted for a sparse attendance. Ten members, however, showed their determination to take all risks. The route followed was the usual one by the main road from Caldwell station to the northern end of the loch, thence crossing to its western side and passing through the woods and along the marshes to

the southern end where the infant waters of the Lugton emerge from the loch. A most enjoyable walk was taken to the end of the woods, the rich vegetation affording plenty of interesting material to the enthusiasts, and most of the special plants of the locality were seen, including the increasing abundance of the little incomer Willow-herb (*Epilobium nummularifolium* R. Cunn.) on the roadsides, and the immense beds of *Carex paniculata* L. around the eastern end of the loch. Plants of the Water-hemlock (*Cicuta virosa* L.) were seen in fine flower, and the Bog Bed-straw (*Galium uliginosum* L.) was found with its much more common relative the water species (*Galium palustre* L.). Some plants of *Rumex longifolius* DC. were also observed. As the party emerged from the lower end of the woods, however, the threatening clouds at last broke into heavy rain, and it soon became evident that further work would have to be abandoned for the day. Thus ended rather abruptly one of the most promising of the season's outings.

The annual visit to Possil Marsh was paid on 31st July, when nine members turned up. Nothing of note falls to be mentioned in this connection except that the date coincided with the final day of the remarkable "heat wave" which passed over the country during the closing days of July, making the work of the botanists, especially among the willows at the northern end of the marsh, something of a trial.

Perhaps the most successful of the section's excursions was the one which actually closed the season, held on 14th August, when fourteen members visited Cleaves Cove, near Dalry. This locality has not been visited by our Society for a good many years, although its peculiar topography—indelibly associated with the name of the late John Smith—at one time had a curious fascination for many of our members. The afternoon was warm and sunny, and a most enjoyable time was spent, not the least point of attraction being a delightful "al fresco" tea about half-way on the journey. The list of plants noted includes well over a hundred species seen in flower, the most notable among them being *Lepidium Smithii* Hook., *Geranium sanguineum* L., *Lactuca muralis* Fresen., *Echium vulgare* L., *Scrophularia Ehrharti* Stev., and *Epipactis latifolia* Sw.

This sums up the outdoor activities of the Section; but mention should be made also of the work of members in connection with the annual exhibition held on 14th June, and of other items recorded in the Society's minutes, which go to show that botanical study continues to maintain its place among the foremost interests of our Society.

RICHARD PRASHER, *Convener*.



## ZOOLOGICAL SECTION.

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### REPORT FOR THE YEAR 1948.

Dr. H. D. Slack of the Zoology Department, Glasgow University found the following Lampreys in the Loch Lomond area. On the 16th June, 1948, a Sea Lamprey (*Petromyzon marinus*) was found in the River Endrick, below the Drymen road bridge. This animal has been recorded from the River Leven and other unstated streams in the Loch Lomond area. Planer's Brook Lamprey (*Petromyzon planeri*) has been found in the burn which runs into the loch at the University Field Station at Rossdhu. This is a species not previously recorded from the West of Scotland.

A freshwater Polyzoan (*Paludicella* sp.) was found in Dougalston Loch in February, 1946. It was associated with the Sponge *Ephydatia*.

AGNES A. MEIKLE.

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### SOCIETY MEETINGS.

#### 13TH JANUARY, 1948.

The first meeting of the Eighteenth Session was held on the 13th of January with Prof. John Walton, President, in the chair.

An announcement was made of the death of Mr. Wm. M. Pettigrew and also of Mr. Wm. McIntyre.

About forty-two members and friends were present to see the photographic display which is usually a feature of this meeting. Miss Craig contributed a collection of beautiful coloured slides of the mountains of Sutherlandshire. These were followed by three films, "The Life Cycle of the Maize," Oliver Pike's "Bird Sanctuary," depicting the bird life of the Farne Islands and the Northumberland Coast, and "Wood Ants," which showed an ant's nest in a Surrey wood and the life cycle and work of the inmates of the colony. Finally, a wonderfully detailed collection of micro-photographs of botanical and zoological subjects was shown by the Rev. J. B. Wanless.

#### 10TH FEBRUARY, 1948.

At the second meeting of the Session, Mr. John R. Lee, Vice-President was in the chair.



As this was the occasion of the Annual Business Meeting, the officials of the Society submitted their reports which are printed elsewhere in this volume.

The election of office-bearers made the following alterations to the Council :—Prof. Kenneth W. Braid was elected Vice-President. Miss Mabel G. Scott, Mr. Daniel M. Lothian and Dr. J. Inglis Cameron were elected Members of Council. Mr. John Boyd succeeded Mr. John R. Lee as Delegate to the Conference of the Corresponding Societies of the British Association. Mr. Thomas Robertson succeeded Mr. Wm. Russell as Trustee owing to the latter's unfortunate ill-health. Rev. J. B. Wanless succeeded Mr. Jas. Anderson as Convener of the Microscopical Section. The remaining office-bearers were all re-elected.

9TH MARCH, 1948.

Professor John Walton chaired the third meeting of the Session.

The following new members were admitted to the Society :—

Mr. Alex. Brown, 20 Kirkland Street, Glasgow, N.W.

Mr. John M. Hughes, 78 Dykemuir Street, Glasgow, N.

Mr. Thomas B. Lindsay, 216 Woodlands Road, Glasgow, C.3.

Mr. Douglas G. R. Sangster, 69 Leadside Road, Aberdeen.

The speaker of the evening, Mr. Thomas Gordon, described his experience as a Clyde Coleopterist in Kent. He remarked that many of the rarer beetles were not found in the area normally covered by the activities of the Society and that the South-eastern counties of England, and in particular Kent, were among the best localities available in Britain.

Kent, with an area of 1,555 square miles, was equivalent to about three-quarters of that of Ayrshire and Lanarkshire combined. Much of the land was affected by the prevalence of the Cretaceous chalk deposits and the resulting calcicolous flora with its accompanying insect life was remarkably in contrast to the Clyde Area. Botanically there was a greater range than in South Scotland and the large number of Orchids were particularly noticeable. Mr. Gordon was warmly thanked for his lecture and in particular for the large number of questions which he so willingly answered.

12TH APRIL, 1948.

Mr. John R. Lee presided at the fourth meeting, when he introduced the speaker, Mr. C. Eric Palmar, M.B.O.U., who delivered a lecture on the Golden Eagle.

Mr. Palmar mentioned that the Golden Eagle was certainly the largest of our British birds with a wing-span in the male of six and a half feet and in the female a little more. It was, however, not as rare as might be supposed and the number of pairs in the country was now possibly about 250, the largest increase being in the Western Highlands.

He mentioned that, although the diet of the bird had changed from the now scarcer grouse, ptarmigan and mountain hares, to that of rabbits and dead sheep, there were relatively few authenticated cases of the eagles taking live lambs.

The eagles normally build their eyries in glens between 1,500 and 2,000 feet up, and were thus not easily seen unless searched for.

Mr. Palmar also mentioned the following facts :—

Eagles nest about 8 to 12 miles apart and thus have a fairly large territory.

The eggs are generally laid between the 28th of March and the 5th of April. Usually two eggs are laid and hatched, but often only one eaglet reaches maturity.

Four or five years may elapse before an eaglet reaches maturity, but the life-span of the Golden Eagle is probably between 50 and 100 years.

Mr. Palmar illustrated his talk with a profusion of screen projections and two fine films of the life of the eagle and the rather dangerous terrain where the eyries are found.

10TH MAY, 1948.

Professor John Walton, who chaired the fifth meeting of the session, announced the death of Emeritus Professor Frederick Bower on 4th April at the age of 94 years. He also gave a short summary of Professor Bower's work in the advancement of botanical science and Dr. Patton spoke of his impressions of Professor Bower as a teacher and lecturer.

Mr. Lee exhibited four specimens of mosses :—

*Tetraphis Browniana* Grev. ;

*Amblystegium felicinum* De Not. var. *trichodes* Brid. ;

*Heterocladium heteropterum* B. & S. ;

*Andreaea crassinerva* Bruch.

The first two came from Torrance Glen, East Kilbride, the third from the Whangie, and the last from a dolerite quarry near Langbank.

Other exhibits were some fossil plants and the rather uncommon seaweed *Fucus serratus latifolia*.

Mr. Ernest Stollery, who was speaking on "Modern Geological Trends," emphasised the caution required in predicting

trends of study. He gave an account of the evolution of the subject, which begins with perception or recognition, proceeds through description, nomenclature and classification to the study of the object, or classified group of objects, in relation to the dimension of time ; later comes the study of the objects concerned in relation to, and as part of, their environment—Ecology, finally, the symbolisation of measurable dimensional properties mathematically—Metrics.

The geological subjects still at the stage of perception and elementary study were the Calcareous Algae, Fossil Bacteria and many of the lesser known micro-fossils.

Stromatolites were suggested as structures of interest owing to the greater diversity of opinion as to their origin and to the fact that even such difficult material could be used for "zon-ing" rocks. Mention was also made of the use of radioactive age indicators, insoluble residues and the techniques of petrofabric analysis. Finally, the lecturer put in a plea for the study of pathological conditions in fossils by the more medically knowledgeable naturalists.

14TH JUNE, 1948.

At the sixth meeting, chaired by the President, four new members were admitted to the Society :—

Mr. Andrew Hamilton Brown, 144 Woodlands Road, Glasgow, C.3.

Miss Mary A. McLintock, M.A., 276 Hillington Road, Glasgow, S.W.2.

Mr. C. Eric Palmar, M.B.O.U., 65 Clarkston Road, Glasgow, S.4.

Miss Mary R. N. Stark, M.A., 70 Carsock Street, Glasgow, E.1.

Firstly, Mr. Thomas Robertson read the list of summer migrants to the Clyde Area compiled by members and friends.

Mr. Rennie then exhibited a specimen of *Peziza cerea* Sow. collected in Kelvingrove and identified by Dr. J. Ramsbottom.

To mark the occasion of Mr. J. R. Lee's eightieth birthday, he was presented with a cheque and an illuminated address from members and friends of the Society. In making the presentation, Professor Walton remarked that Mr. Lee was an original member of the Andersonian Naturalists' Society from 1885 to 1931 and President from 1911 to 1914. He also was a member of the Microscopical Society in Glasgow. When these societies combined in 1931 he was the first President, from 1931 to 1933.



Mr. Lee has also taken an active part in the activities of the Bryological Society and has contributed many papers on bryological and other botanical subjects, while his "Flora of the Clyde Area" is a model of what a pocket flora should be.

He has been for several years Honorary Curator of the Glasgow University Herbarium, where his own fine collection holds an honoured place.

Several letters of appreciation were received and, of these, four were read to the meeting, from Professor L. A. L. King, Professor J. R. Jack, Mr. Gavin Paterson, Senr., and Mr. Kenneth H. Cochran.

Mr. Richard Prasher, Convener of the Botanical Section, spoke of the help and guidance all members of the Section had received from Mr. Lee; while Mr. John Boyd emphasised his untiring aid to newcomers to the Society's excursions.

Dr. Donald Patton referred to Mr. Lee as the leading plant ecologist in our area and as one who was always prepared to spend much time in the preparation and illustration of the excellent lectures which he has given to the Society on many occasions.

Dr. Patton mentioned some happy recollections of the excursions to Ben Lawers and of Mr. Lee's kindness and enthusiasm in initiating new members into the wonders of that botanical haunt.

Members and friends then examined the very fine collection of exhibits displayed by the Botanical, Geological and Microscopical Sections.

#### 12TH OCTOBER, 1948.

In the absence of the President, Mr. John R. Lee took the chair.

The death was announced of Mr. Kenneth H. Cochran.

The speaker, Mr. John Douglas, D.I.T.A., F.I.T.A., gave a lecture on "The Royal Botanic Gardens, Kew." He described the details of its opening by King George III in 1760, its growth until 1820, a decline until 1841 when Sir William Hooker left Glasgow to build up its prestige. He showed many fine projections of the Houses and of individual specimens—Magnolias, Water-lilies, Orchids and Succulents, and described many of the difficulties and hazards of the plant-collector.

#### 9TH NOVEMBER, 1948.

Dr. Donald Patton presided at this, the eighth, meeting of the Session when the following new member was admitted:—

Mr. Russell Hunter, B.Sc., F.G.S., Dept. of Zoology,  
University of Glasgow.



Dr. J. Inglis Cameron then read a note on the late flowering of *Fragaria vesca* and requested other members who might have seen similar cases to inform him.

The speaker for the evening, Mr. C. E. Reynolds, spoke of touring through Scandinavia and described many of the interesting buildings in Copenhagen, its fine beech-forest, and the celebrated castle at Elsinore. He showed many photographs of Bornholm and Gothland, famous botanically, geologically and for their antiquities and finally showed a number of illustrations of parts of Sweden and Finland.

Members heard, with regret, of the death that day of Mr. John McCrindle, fisherman-naturalist of Dunure, Ayrshire.

14TH DECEMBER, 1948.

The last meeting of the session was held on this date with the President, Professor John Walton in the chair.

One new member, Mr. Cyril E. Reynolds, F.R.G.S., Braid Hill Cottage, 20 Jordan Lane, Edinburgh, was admitted to the Society.

The President exhibited a specimen of Water-Crowfoot showing, in addition to the normal leaves and filamentous submerged leaves, one leaf which combined both characteristics.

The speaker on this occasion was Mr. John Boyd, who had taken for his subject : "The Renfrew Heights." He described the variability of the ecological types due in some respects to the variety of types of exposure. Parts of the hills were very desolate and marshy, where the clayey soil allowed the formation of peat it was often to a depth of six feet. Reptiles were scarce, but bird life was extremely varied considering the lack of cover—Dipper, Sandpiper, Snow Bunting, Ring-Ouzel and Kestrel having been seen. Vegetation was good on the banks of the burns and at waterfalls, while the larger Dragonflies were seen to an altitude of 1,000 feet.

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## OBITUARIES.

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### RICHARD ELMHIRST, J.P.

Richard Elmhirst, Director of the Marine Biological Laboratory at Millport, died suddenly on the 13th of November, aged 64. He had been in failing health for some time but was looking forward to normal retirement on the 31st of March, 1949.

Born in a country rectory, near Leeds, and educated at Rossall School, on the Lancashire coast, he acquired early a taste for the study of Natural History, which was to become

his life's work. He has spoken of museum experience at Keighley and at Leeds, where he came into contact with Professor L. C. Miall, F.R.S., a pioneer in the teaching of Nature Study on scientific lines.

Elmhirst had gained experience in Marine Biology at Plymouth before he came to Millport, in 1906, as Naturalist assisting Mr. S. Pace, the Director. On the resignation of Mr. Pace in 1907, Mr. Elmhirst was put in charge of the Station, with the title of Superintendent. Staff and resources were small, so the work was hard, but it brought him into personal contact with people in great variety, fishermen, naturalists, students, teachers, professors and research workers, not only from Britain and the continent of Europe but even from further afield.

All found something to respect in him and many have expressed gratitude for the valuable help that he was so able and so willing to give them. He had many friends, and he kept them.

During the First World War he served in the Royal Navy and commanded one of those small but adventurous craft, the "M.L.s," or Motor Launches, largely in the Dover Patrol.

He returned to Millport, a married man, with undiminished enthusiasm for Marine Biology and with intensified interest in the special study of *Shore Ecology*, the relation of shore organisms to their environment both animate and inanimate.

The list of his published papers on this and on other aspects of marine biology is too long for inclusion here, but it will be available in the Annual Report of the Scottish Marine Biological Association. His revision of Dr. Marion Newbigin's book on "Life by the Seashore" is probably known to most of us, and he had been for some years engaged upon the preparation of a new book of his own.

After 1921, with the help of the Development Commission, the station staff was increased and strengthened. In 1933, Elmhirst became Director, a recognition well merited by the position attained by the Laboratory under his guidance. The extension of the buildings, before the Second World War, further increased the value of the institution. Mr. Elmhirst himself offered spare-time war-service as a Special Constable on the island, and he was described by a member of the Regular Police Force as "one of the best Specials we have ever had."

As a Justice of the Peace he was engaged on public service in Bute on the day before his death.

To the Glasgow and Andersonian Society, of which he was a valued member, he was always welcome as an inspiring lecturer, who took infinite pains to convey the latest information with the help of abundant living material. He used to

arrive loaded with bottles and jars. At the Millport station he welcomed the visits of the Society, for which he had always prepared new and instructive demonstrations with enthusiastic co-operation from the whole scientific staff. He was a genial host whom it was always a pleasure to meet. His knowledge of the marine life of the Clyde Area was unique, but one remembers gratefully that it was widely distributed during his lifetime, not only by publication but also by classes which attracted large numbers of the younger naturalists from schools and colleges, and by outside lectures, including recently an Invitation Course delivered by him at the University of Cambridge. So, though the personal touch is lost, the influence of Richard Elmhirst carries on.—L. A. L. KING.

### KENNETH H. COCHRAN.

Although Mr. Cochran could not be regarded as a veteran member of this Society, he took a great interest in the various sections—especially the Botanical Section. Latterly he was prevented by ill-health from taking a more active part.

Mr. Cochran was an honours graduate in mathematics and Natural Philosophy at St. Andrews University, where he also gained distinction in Chemistry. Although primarily a physicist, he had a great interest in the Natural Sciences. When he became a teacher of Science in Coatbridge Secondary School (1913), he found that the teaching of Botany and Chemistry could be correlated to the advantage of both sciences. When he became Principal Science Master in Coatbridge Sec. School, he presented candidates for the Higher Leaving Certificate in Botany and Chemistry as well as in Physics.

Mr. Cochran was transferred to Wishaw High School in 1942 as Principal Teacher of Science. There he continued his teaching career until 1946, when, on account of the state of his health, he had to retire—a step which was greatly regretted by his rector and colleagues. At a farewell meeting, tribute was paid to his work as a teacher and his geniality as a colleague and the wish was expressed that he would have a long and happy period of retirement; but this was not to be, for Mr. Cochran passed away on 2nd October, 1948.

As a member of this Society, Mr. Cochran was a keen botanist, and at excursions he was quick both to learn and to give of his knowledge. He was intensely interested in the Flora of Clydesdale and took a special interest in the Vegetation of the Tinto Hills.

He was of a quiet and unassuming disposition, and was respected by all who knew him.

We extend our sincere sympathy to his bereaved family.

—DONALD PATTON.

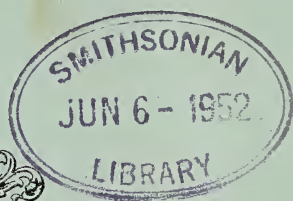


47

# The Glasgow ❖❖ Naturalist

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# CONTENTS

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|  | PAGES |
|--|-------|
| BRACKEN—A BOTANIST'S PLAYTHING AND AN AGRICULTURAL PEST.   |       |
| K. W. Braid, M.A., B.Sc., B.Sc.(Agric.), F.R.S.E.  | 61    |
| NOTE ON THE LATE-FLOWERING OF <i>Fragaria vesca</i> .  |       |
| From observations of J. Inglis Cameron, M.B., Ch.B., F.R.F.P.S.(Glasgow)     ...     ...     ...           | 67    |
| THE STORY OF A MOORLAND GRASS ( <i>Molinia caerulea</i> ).   |       |
| Rev. Thomas A. Jefferies, M.Sc., F.L.S.     ...     ...  | 68    |
| THE NEW ZEALAND WILLOW-HERB.   |       |
| John R. Lee, M.A.     ...     ...     ...     ...     ...  | 70    |
| MAJOR PESTS OF STOCK AND CROP IN THE WEST OF SCOTLAND.   |       |
| D. Stewart MacLagan, B.Sc.(Agric.), Ph.D., D.Sc., F.R.S.E.     ...     ...     ...     ...     ...     ... | 74    |
| PHASE CONTRAST MICROSCOPY.   |       |
| W. G. Hartley, B.Sc., F.R.M.S.     ...     ...     ...   | 76    |
| THE ADAPTATIONS OF FRESHWATER GASTROPODA.  |       |
| W. Russell Hunter, B.Sc., F.G.S.     ...     ...   | 84    |
| SOME INSECTS OF CAMBUSLANG, NEAR GLASGOW.  |       |
| D. M. Lothian     ...     ...     ...     ...     ...  | 86    |
| LIST OF FIRST ARRIVALS OF SUMMER BIRDS IN CLYDE AREA IN 1949 and 1950.                                     |       |
| Compiled by Thomas Robertson     ...     ...     ...   | 91    |
| From the Reports of the Society Excursions, 1949 ...   | 93    |
| From the Reports of the Society Excursions, 1950 ...   | 95    |
| From the Sectional Reports, 1949     ...     ...     ...   | 98    |
| From the Sectional Reports, 1950     ...     ...     ...   | 99    |
| Digest of the Proceedings of the Society, 1949     ...     ...   | 101   |
| Digest of the Proceedings of the Society, 1950     ...     ...   | 104   |
| Index     ...     ...     ...     ...     ...     ...     ...  | 109   |

# The Glasgow Naturalist

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1952

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## BRACKEN—A BOTANIST'S PLAYTHING AND AN AGRICULTURAL PEST

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Condensed from Presidential Address

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By K. W. BRAID, M.A., B.Sc., B.Sc.(Agric.), F.R.S.E.

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*(Delivered 11th October, 1949)*

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I had the honour to address the Society in May, 1933 on "Bracken as an Invader." To-night I wish by reading part of a paragraph (p. 37-38) from that paper<sup>1</sup> to centre my remarks mostly on a review of what has been done since that date and to correct and amplify remarks made in that earlier paper. I then wrote:—

"In the open, formation of 'sporelings' appears to be the exception and usually the fern reproduces vegetatively by its extensive rhizome system. The apparent rareness of 'sporelings' may be due to inadequate observations or to their spasmodic occurrence . . . To assume that bracken nearly always spreads by means of its rhizomes pre-supposes that the whole country was once covered by bracken, that this was broken up into patches by frost, suppression, agricultural encroachment, exploitation of the fern and other causes and that this continued until there were myriads of small areas . . . The number of references to sporelings being found in the field is meagre, but there are numerous specimens in the various Herbaria, as at the British Museum and at Kew, and, I believe, that in certain seasons, they must be produced frequently. In the laboratory

a sporeling, from a spore sown the previous autumn, can produce many fronds 6 ins. to 15 ins. high and a small rhizome by the middle of August."

The major points regarding the life history of the bracken plant were worked out by Hofmeister and Klein over 100 years ago and soon after were well figured in this country by Ray. Briefly the spore set free from the frond germinates and produces a minute plant—the prothallus—which bears the sexual organs and after fertilization of the egg a baby fern arises on the prothallus and is nourished until it is sufficiently developed to be self-supporting. In ferns like the bracken an underground branch or rhizome serves a dual purpose, as a storage place for food reserves and an organ for vegetative spread. In the greenhouse, on sterilised soil, prothalli and ultimately baby bracken plants can be raised from spores with ease. Why are these so rare in nature?

The German scientists said that the fronds in bracken were initiated as buds on the rhizome *many* months in advance of unfolding above the soil. It was obvious that this was not true for baby plants and the slowness with which bracken died under continued defoliation did not support this view, so experiments were laid down to re-test the statements. By 1937<sup>2</sup> evidence was brought forward to show that fronds were more rapidly produced, but the rate of formation was not fully worked out, and pressure of other work made the investigation slow. Luckily, early in the war, Mrs. E. Conway, Ph.D., of the Department of Botany, Glasgow University, offered to assist in the work. Some years later the Agricultural Research Council offered a grant which made technical assistance possible, so the scope of the work was increased to study all factors which influence the growth and development of spores. Part of these experiments have been described by Dr. Conway<sup>3</sup> so it will only be necessary to refer to them briefly. She tested the germination of spores which I had collected and kept dry over the previous ten years and found that those of the current year gave good germination in a few days and according to age the older samples exhibited progressively poorer powers of germination and required much longer to start, though one-third of the four year-old spores were viable. Indeed the viability began to fall soon after collection with a 95% of germination for the first month. Temperatures of 50°F. to 60°F. gave rapid growth: higher temperature encouraged fungi and at 95°F. no germination was seen. Low temperatures just above freezing gave small germination and took some weeks instead of days. Germination takes place in light or in darkness but the flattening of the prothallus starts early in the former while in the latter only a filament is formed.



Ample illumination greatly increases both the rate of germination and the prothallial development. It has long been suggested that<sup>4</sup> a dry atmosphere was one of the causes of large mortality of bracken prothalli. This was verified experimentally by growing the prothalli in an artificially dried atmosphere.

In nature, bracken is usually found on acid soils, but in greenhouses the sporelings are normally grown on sterilised neutral or alkali loam, so experiments were tried of the effects of acidity or alkalinity on the germination of spores. In very acid, sterilised soil the spores failed to germinate but on the slightly acid and neutral soils the germination was highest and most rapid. Thereafter it fell off again. It is noteworthy that the subsequent development of the sporophyte and rhizome was best in the acid soils—the type of soil in which we expect to find bracken. In unsterilised soils the prothalli were usually swamped by growth of mosses, algae, etc., and the development was markedly less healthy. There are possibly other biotic factors which limit the development in unsterilised soils.

Once the sporeling has produced its juvenile fronds (which are quite unlike the mature ones) it soon develops a root system and a rhizome which bifurcates and begins to throw up fronds from its subterminal buds. These are small, but look like normal fronds and as the rhizome grows and thickens the fronds get more and more normal in size and appearance. We already had had sufficient experience in trying to confine the growth of rhizomes in my garden in 1941 and 1942 so to limit it to two planes, “brackenaria” were made at Auchincruive. They were of two types. In the vertical model, concrete slabs formed two parallel troughs 6 ft. long by 2 ft. deep and 4 ins. wide. These were held together by supports and wire and filled with John Innes Potting Compost. The slabs were removable from the front so at least one plant could be examined *in situ* and the rhizome growth noted. The following year another model increased the depth to 2 ft. 6 ins. The flat brackenarium (6 ft. square) had a bottom of four “yard square” slabs sunk to a depth of 9 ins. and filled with compost to soil level. This gave the horizontal “picture” of rhizome spread and prevented the rhizomes from burrowing too deeply. The choice of site and compost was to give optimum conditions. Sporelings from 3 in. pots, with 5-6 immature fronds, were planted in the upright brackenarium (one behind and two in front) on 29th March, 1943, and by the 10th of October (28 weeks) one had developed rhizomes of four main branches of which the two longest measured 55.5 ins. and 30 ins. respectively or a total of 85.5 ins. and spreading from



one end of the trough to the other. The rhizome became stouter and bore larger and larger fronds as it stretched from its point of origin. The back plant was undisturbed for two years and in 1944 produced 64 fronds and some of these bore sporangia. The plant in the flat brackenarium was almost equally vigorous. It was clear frond development was "dependent on nutritional factors" and obviously "the older idea that only one frond unfolded on a branch each season is untenable." This confirmation completely altered our conception of the means of controlling bracken. It was shown also that in a mild season growth goes on in the underground parts all winter.

For over twenty years I had searched in vain for wild bracken sporelings but amongst the plants which took possession of the bombed sites in London, Bristol and other cities were bracken sporelings. Accounts of scores of plants amidst ruins were soon forthcoming and many of these grew into large colonies as the years went on. So examinations were made of such sites in Clydebank and in Greenock. Many plants were found, but our colder autumns presumably did not give comparable conditions to those in the south. The plants grew especially in wet places in rubble where moisture, absence of drying winds and non-acid soils were available. Then I discovered three sporelings widely separated in old walls requiring pointing in Milngavie and district and in quarried rocks on the side of the Duke's Road near Aberfoyle. Others were seen on neutral soil in Iona and in a few places in West Argyll—near Dalmally and on Loch Fyne.

Some of the latter were doubtfully juvenile and might have been drowned out relics of larger colonies. As Poel<sup>5</sup> has shown bracken suffers in moist soils when aeration is lacking and often exists as tiny fronds 4 ins. to 8 ins. high near rocks in such places. As a rule, digging usually reveals the presence of old, dead rhizome-remains in such cases. The flooding of areas is an old method for the eradication of bracken.

Let us consider now the agricultural aspect. Bracken by its spread reduces the grazing area, leads to less and inferior grass. Sheep "struck" with the maggot-fly take shelter in it and since they cannot be found in time for treatment die there. Bracken greatly adds to the trouble of shepherding.

The systematic destruction of the fronds year by year (if persisted in) ultimately depletes the rhizome of all its reserves so that the plant dies. The scythe, in the hands of a conscientious worker, is the ideal instrument and nothing is missed. Experiments were laid down near Oban in 1934 and some plots were cut three times a year, others twice a year and others once. In four years the thrice cut plots were

free from bracken, but it was eight years before some of the twice cut plots showed extermination. Once cut plots were reduced when cut about midsummer but after fifteen years none was free from bracken.

In order to speed things up and reduce the labour costs, machines have been introduced, but as they do not conform to the surface of the soil like a scythe, so far they have never been as effective. Some duplicate the action of a mowing machine (Allen Motor Scythe, Atcosythe and Mayfield) but a specially constructed machine with folding blades which are held open by centrifugal force, invented by C. M. Collins and made by G. Henderson has given good service since 1935. The latest edition can be mounted behind a Ferguson tractor. Bruising machines which squash the fronds and more or less break them are often cheap and foolproof. They comprise the Aitkenhead Harrow Attachment and Glaslyn, no longer produced but still working, and the modern Cuthbertson and the Holt Bracken Breaker. No machine seems to be able to conform sufficiently to the soil to bring about complete extermination, but the cutting machines reduce the growth more quickly and completely than the bruising machines.

Dusting and spraying machines have been tried, but up till now there has been no suitable toxic chemical which can be applied sufficiently cheaply. Chlorates while effective are very expensive and exterminate the grasses as well.

The effect of trampling by stock is very efficacious, especially in the spring months of the year when the soil is moist and the young shoots are approaching the surface. Healthy sheep avoid bracken when it is fully grown but the more they can be moved over it in the young, brittle, hook-stage the better. Machine treated areas should be stocked as heavily as winter-keep will permit.

There are two interesting aspects. Although it has not been possible to infect areas with bracken disease at will, here and there patches of from a few square yards to six acres die out quite suddenly. What is still more encouraging is the fact that many large areas show one or two more or less central plots from which the bracken is dead or dying. Sometimes this is due to wind damage and the existing fronds are frequently stripped and have formed funnel-shaped depressions in the soil by their movements. The destruction of trees as well as bracken cutting removes the buffering effects which vegetation can offer and adjacent bracken then begins to show the effects of "wind damage." Patches bare of bracken on peaty hillsides do not help matters, for even with liming and manuring grass seeds do not grow sufficiently well on

such inhospitable sites to lead to colonisation with good grasses. Such and other experiments are being conducted at the Bracken Experimental Station of Ballochraggan, Port of Menteith, Perthshire, but it is still too early to report on their results except to mention that initially Dr. Poel has made botanical maps of over 100 acres of the area on which to base our observations.

My concluding remarks in 1933 were :—" The pity is that, in a problem of such fundamental importance to the agriculturist, the investigations have to be the spare-time hobby of a few interested people." It is a pleasure to be able to bring this up-to-date. In 1934 the Department of Agriculture for Scotland appointed a small committee to " Investigate the Eradication of Bracken."

Principal W. G. R. Paterson was the original Chairman and there was a representative from the Department of Agriculture for Scotland, the University, and others from the Agricultural College. I had the honour to be appointed Chairman when Principal Paterson retired in 1946. This Committee, financed by the Department, has undertaken the study of possible machines and other methods of destruction, investigated the agricultural aspects of the problem and produced an instructional film on bracken destruction. Mr. D. Reid, B.Sc., holding a Boots Grant, and Mr. C. McQuarie, B.Sc., did valuable work on bracken utilization in the 1939-42 period.

In 1943 the Agricultural Research Council called a conference under the Chairmanship of Sir Edward Salisbury, F.R.S. to consider the more fundamental botanical issues. They gave their blessing to the work on the juvenile plant which Dr. Conway and I had in hand and made grants available for technical assistance. Dr. A. S. Watt of Cambridge had been working for a number of years on the Brecklands habitats and other lines of research were initiated for London workers. It is gratifying that two other workers from Scotland—Professor John Walton and Mrs. Conway—have been invited to later conferences.

Lastly, I am glad to say that the Scottish Machine Testing Station and its " parent body " in England, are now taking an active interest in the machine side and, as experts, considering the problem from that angle. In every way I think the prospects are now most hopeful and heartening.

In closing I would like to acknowledge my indebtedness to Mrs. Conway for her valuable help and to those scientific and technical helpers like Miss Arbuthnott, B.Sc., Miss Stephens, B.Sc., Miss Myers, C.D.H., Miss McCallum, B.Sc.,



Messrs. B. P. Perry, Robert D. Fotheringham, Matthew S. Muir, J. M. Ramsay and A. M. Stirling who have put so much work and thought into the investigations.

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### NOTE ON THE LATE FLOWERING OF *FRAGARIA VESCA* LINN.

By Dr. J. Inglis Cameron

October, 1948—January, 1949

Dr. Cameron kept a record of the flowering of some wild strawberry plants growing on a walled bank by the roadside near Castlehill, Bearsden. The exposure of the wall is West by South West, facing falling ground on the opposite side of the road. The bank is not a sheltered one. The record of his observations is as follows :—

| Date |    | Number of Flowers | Date |    | Number of Flowers |
|------|----|-------------------|------|----|-------------------|
| Oct. | 27 | 1                 | Dec. | 7  | 11                |
| "    | 30 | 6 to a dozen      | "    | 11 | 7                 |
| Nov. | 6  | 12 approximately  | "    | 14 | 12†               |
| "    | 9  | More than 12      | "    | 18 | 10†               |
| "    | 12 | Less than 12      | "    | 21 | 6†                |
| "    | 16 | 8*                | "    | 24 | 6†                |
| "    | 19 | 8*                | "    | 29 | 2* + 2†           |
| "    | 24 | 9*                | Jan. | 6  | 1* + 2†           |
| "    | 30 | 4*                | "    | 14 | none              |

\* These numbers refer to specimens in full bloom.

† These numbers refer to very poor specimens.

Numbers unmarked include, but are not made up exclusively of, plants in full bloom.

Dr. Cameron considers that the continued late flowering of this species in the Glasgow district is noteworthy, perhaps a record. It is no doubt explained by the mild winter.



# THE STORY OF A MOORLAND GRASS

(*Molinia caerulea*)

By Rev. THOMAS A. JEFFERIES, M.Sc., F.L.S.

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*Summary of Lecture delivered 19th December, 1950, and revised  
December, 1951*

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For many years I have made a study of this moorland grass, *Molinia caerulea*. There are several varieties of it, six being listed by G. Claridge Druce at Oxford, but I have distinguished sixteen varieties and think there may be more. *Molinia* is known in the north of England as Blue Moor Grass, Purple Heath Grass or as just plain "Bent." It is distinguished by its colour and upright habit. The purple tinge is more apparent when the plants are massed together, as they frequently are, owing to the habit of the plant to grow into tussocks, by which, when these come into contact, large stretches of *Molinia* are formed. The grass is not much cultivated as it has little agricultural value, but the basal portion of the stem (basal internode) and the leaves while young are eaten by sheep or cattle. Hillsides with the grass growing to a height of four feet are not rare in the West Riding and leaves up to three quarters of an inch in width have been observed in the same region on a dwarf variety.

The plant is equipped to contend with all the dangers arising from the vagaries of the climate on our upland moors. During winter, the layering of the dead leaves helps to protect the swollen bases of the stems and the new shoots against frost and snow. The thick walls of the basal internodes consist mainly of a food reserve, hemi-cellulose, and surround cavities which contain further reserves of starch and protein or aleurone grains. These swollen stems reach a thickness of from 0.25 in. to 0.5 in. at the bottom, tapering in the upper half to the solitary joint. Early in the new year these reserves of food are drawn upon to nourish the growing buds at the bottom of each stem. Late frosts, such as are sometimes experienced in May or even June, are inimical to the grass, destroying the young shoots at a time when the food reserve has become largely depleted; but *Molinia* can cope with even this setback, having an additional supply of starchy food material stored in the cortex of the thick roots below the surface, which can be used in just such an emergency as this.

Summer on the moors may produce conditions even more dangerous than winter, including drought and moorland fires. To meet this new threat to its existence, *Molinia* is helped by

its erect habit of growth. This protects the chloroplasts from excessive sunlight and enables carbon assimilation to proceed. By the control of the stomata on the upper leaf surface and the ability of the grass to roll in the edges of its leaves (a power due to the possession of rows of large mechanical cells between the ridges on the upper surface) *Molinia* checks excessive loss of water. The plant is also adapted to withstand long periods of drought by its elaborate root system which may penetrate to a depth of eighteen inches instead of the usual three to six inches common in grasses. These strong roots are of two kinds: cord roots with the food reserves in the cortex and fine branch roots. The cord roots are well supplied with root hairs throughout their length and can absorb water, from slight showers, near the surface. The fine roots have hairs near their tips and can absorb water from the large mass of peat they reach. Should heavy rains come and flooding occur, *Molinia* is again equal to the occasion. It is able even to change its level and attain permanent height by elevating its rhizome from half an inch to six inches, in order to escape a permanent rise in the water table. Another advantage is gained by the seeds having the power of germinating under water.

Some doubts have been expressed as to whether *Molinia* is really a native of Britain, one opinion being that it may belong to the southern hemisphere; that the plant is a stranger may account for the fact that the cells contain thirty-six chromosomes instead of the usual seven or multiple of seven common in our grasses.

Revision, a year after this lecture was given, enables me to say that most of the facts presented were published in my original papers in 1915-16\*. The number of chromosomes, however, belongs to later work which has never been published save that the number referred to was announced in 1935. This later work was done at Durham University, Newcastle-on-Tyne, in 1932-3 and included an attempt to secure a meiotic division which was not successful and could not be repeated.

Recently, with the aid of Professor Braid, an experiment has been started by damming up a plot of marshy land at Ballochraggan to see whether the idea, expressed in the lecture, of raising the level of the plant by elongating the rhizome vertically, is something more than a rare accident, whether in *Molinia* or in plants of other families.

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\* See "The Journal of Ecology," Vol. III, No. 2, June, 1915; and "The New Phytologist," Vol. XV, Nos. 3 and 4, March and April, 1916.

## THE NEW ZEALAND WILLOW-HERB

By John R. Lee, M.A.

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(Read 17th April, 1950)

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Since the publication of the "Flora of the Clyde Area" in 1933, in which it was reported as "very rare," there has taken place a remarkable spread of the little plant belonging to the genus *Epilobium*, an introduction from New Zealand, which was probably first planted as an ornamental rock-plant in gardens, but has now become abundant as a "creeper" on rocks and old walls, not only in our own district, but all over this country.

Unlike all our native species of willow-herb, this plant belongs to a small section of the genus characterised by procumbent stems, branching profusely, and bearing flowers singly in the axils of the foliage leaves. As it was at first looked upon as something of a rarity, it attracted the attention of local botanists, and was recorded from a few localities as a casual or a garden escape. Its identity with the New Zealand plant—apparently a common one in that country—was never in doubt, and it received the name *Epilobium nummularifolium* R. Cunn. on the authority of the experts at Kew. By this name it has been described and listed by many observers from localities all over Great Britain, apparently having become common and wide-spread.

During recent years, however, questions have arisen as to whether the name given to it is the correct one. Doubts of its identity with the New Zealand form of that name have been expressed by a number of authorities; and Dr. Sledge, of Leeds University, in particular has been at considerable pains to examine British specimens from various districts with a view to trying to resolve the doubt. It appears that there are several forms more or less common in New Zealand, all of similar habit, and confusion as to their identity could easily arise. In addition, the evident close relationship of these forms leaves room for difference of opinion as to their specific distinctness.

In order to make sure as to whether the accepted name should stand as correct, Dr. Sledge wrote to a correspondent in New Zealand asking for some specimens of plants from there, for comparison with the British form. Unavoidable delay, owing to the illness of this correspondent, held up the matter for some time; and in the interval there was received by our Secretary, Miss Craig, an interesting request from a



lady in North Wales—Miss Davey, of the University College, Bangor—for information about the occurrence of the plant in the West of Scotland. Miss Davey is engaged in research in connection with the new Biological Flora, and was anxious to know about our local records. Miss Craig handed the matter over to me; and this led to my sending Miss Davey all the information I could find about the plant, in return for which she kindly supplied me with some interesting details about the differences subsisting between the New Zealand forms. Meantime our member, Mr. Mackechnie, had sent specimens which he and I had collected near Loch Libo to Dr. Sledge who said that he believed they, in common with other plants from all over Britain, were a form known in New Zealand as *E. pedunculare* A. Cunn., and should be regarded as a species distinct from *E. nummularifolium*. Later, Dr. Sledge received from his correspondent the plants asked for, and he very kindly sent specimens of both species, and of a third (*E. nerteroides*) for comparison with ours; and I am greatly indebted to Mr. Mackechnie for letting me examine these, and for putting me in communication with Dr. Sledge on the subject.

In a letter which I received from Dr. Sledge, he states his opinion on the question of identity as follows:—

“All the material which I have seen (in this country) is without exception *E. pedunculare*, and I doubt if we have *E. nummularifolium* in Britain; which is rather surprising as both are very common plants in New Zealand . . . I think the name *E. nummularifolium* was formerly applied in a collective sense to cover the related *E. pedunculare* and *E. nerteroides*, in much the same way that *Euphrasia officinalis* covers many segregates.”

From all this it seems necessary that we should carefully examine all our local specimens, and pay special attention to the differences between these forms, in order to be sure of our name. The two plants from New Zealand are very similar in habit, size, branching, leaf-form and inflorescence. In both the stems are numerous, spreading in all directions, and tending to radiate from a common centre. The most important difference, which seems to be quite constant, is in the fruit. Of course, structurally and in general form the fruit of all the species is that well-known and distinctive characteristic of the extensive genus *Epilobium*—an elongate, linear four-valve capsule, dehiscent from the apex downwards, the four valves separating from a central seed-bearing column. In the species called *E. pedunculare* the surface of the capsule is glabrous or nearly so; while in *E. nummularifolium* it is covered with a



dense light grey felt, very conspicuous both when fresh and when dried, even in old herbarium specimens. In the plants from New Zealand submitted to Dr. Sledge this distinctive character was very evident, although in all other respects they were similar. There is a certain variability in the size and form of the leaves; but this is common to both species, and shows itself even in different parts of the same plant. In fact, apart from the fruit the two are practically indistinguishable.

By the kindness of Professor Walton, I am able to exhibit to-night an old specimen (from New Zealand) of the true *E. nummularifolium*, taken from the herbarium of Glasgow University—the only one of this form which seems to be available in Glasgow. This specimen is unfortunately not dated; but there is another one from the herbarium of *E. pedunculare*, probably of approximately the same period, which is marked 1834—over a century ago. In the one of *E. nummularifolium* the grey felt on the capsule is still quite clearly discernible.

Our own local plants must be considered next. I have looked up all the records I can trace regarding the appearance of the species in the Clyde area. The first notice I can find recorded is of an exhibit by Peter Ewing at a meeting of the Natural History Society of Glasgow on 27th February, 1912, when he showed plants of *E. nummularifolium* from Ardrishaig. The notice appears in the *GLASGOW NATURALIST*, vol. IV, p. 131.

Two years later, on 26th May, 1914, Mrs. Ewing showed some specimens in flower from her garden at Uddingston, which had been grown from the original plants brought from Ardrishaig (*GLASGOW NATURALIST*, vol. VI, p. 99).

The next local reference to the plant is that in Grierson's list of "Clyde Casuals" (*GLASGOW NATURALIST*, vol. IX, p. 27), where he mentions it as a casual at Brackenhirst, Lanarkshire (v.c. 77). and refers to it as a "rock-garden plant." This record is dated 1926, at which date it was evidently still regarded as alien and uncommon.

The next reference is the entry in the "Flora," where a new locality in Renfrewshire is given on the authority of the late Mr. John Robertson. The plant was still regarded as a rarity, although it is mentioned that it had appeared as "a casual near Glasgow."

Within the next few years the plant was noted in several places in different parts of our area, notably near Milngavie, from which locality a specimen was exhibited by me which Mr. Rennie had collected during the summer of 1937 (see *GLASGOW NATURALIST*, vol. XIII, p. 79).

In the series of Reports of the Botanical Section of this Society which appears in the *GLASGOW NATURALIST*, vol. XIV, two entries refer to the plant. It is noted at Skelmorlie in 1941, and at Bardowie in 1942, the latter being said to be "another area for this rapidly spreading introduction to 'Clyde.'"

Mention of the plant next appears in the list of the "Flora of Easter Dumbartonshire" which appeared in the *GLASGOW NATURALIST*, vol. XV, pp. 8 and 13. This is dated 1942. By this time the plant had been found in so many parts of our area that it was accepted as an established alien, and a familiar member of our own wild flora. The only remaining instances of its attracting notice in our reports are in two botanical notes of excursions to Loch Libo in July, 1944, where it was seen in "remarkable abundance" (*G.N.*, vol. XV, p. 30) and to Glen Killoch in March, 1945, where its "considerable abundance" is stated (*G.N.* XV, 76).

In all the records referred to the plant is called by the name we have become familiar with—*Epilobium nummularifolium*. The question, therefore, which we have to consider is whether this is or is not correct. I have examined all the specimens to which I have been able to get access since I saw the ones submitted from Dr. Sledge, and in every case those collected within the Clyde area are unquestionably conformable to the New Zealand plant called *E. pedunculare*. All those which have been preserved in the herbarium at the University and in Dr. Patton's collection, and any others which I have seen collected by different observers have the same glabrous capsules; and I feel quite convinced, like Dr. Sledge, that this is the only form which we have here.

There remains, of course, the major question as to whether the distinctive character relied upon for the separation of the two forms is of sufficient importance to justify their being regarded as different species. This is a matter, however, which can only be settled by an intensive study of the plants in their native country, where both are found in quantity, and where it would be possible to observe their reaction to conditions of environment, and the possibility of intercrossing. So long as the authorities in New Zealand are content to keep them separate and to give them different names, it is obviously incumbent upon us to use the specific name for the only form we have with us which is the one applied to it in New Zealand. It is, therefore, necessary that in all future references to our plant we should use the name *Epilobium pedunculare* A. Cunn., and should write off the name *Epilobium nummularifolium* R. Cunn. as an error. This, of course, unless by some chance we are lucky enough in our peregrinations to come across the other one—which would be a "find" of first class interest.

## MAJOR PESTS OF STOCK AND CROP IN THE WEST OF SCOTLAND

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By D. STEWART MACLAGAN, B.Sc.(Agric.), Ph.D., D.Sc.,  
F.R.S.E.

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*(Summary of Lecture delivered 8th May, 1950)*

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Pests are the province of the agricultural zoologist, who meets farmers and gardeners in order to discuss their problems. Zoology is the study of animal life, but zoology as applied to agriculture means also a knowledge of farm and garden. Although a knowledge of structural details is highly desirable, modern teaching emphasises the ecological side, which conveys a wider appeal and links zoology with other branches of science, such as chemistry, botany and geology. The educational value of agricultural zoology is revealed in its relation to food production. Britain at the present day has a population of six million more than in 1914, and this works out at one-half productive acre per person. There is a limit to productivity and no large areas are left to be exploited. Hence the best use has to be made of existing land. Unfortunately, over-intensified agriculture brings in its train a multiplication of pests—particularly noticeable in orchard and glass-house cultivation. Potatoes and sugar beet are suffering to an increasing extent from eelworms, and virus diseases have also increased. The “checks and balances” imposed by nature on plants and animals have been everywhere upset by man. Some species of parasitic worms have increased through overstocking with grazing animals.

The same pests are not predominant every season, as their numbers wax and wane over a period of years. Every eleven years or so there is a sunspot maximum which is generally the crest of the wave for such pests as Diamond-back moth, Leather-jacket, Wireworm, Flea-beetle, Cabbage butterfly and Bean aphid. The fifth year previous to the maximum year and the sixth year after are generally sunspot minimum years. At these two periods the pests are not so abundant. Of these, the wireworm shows a more stable population than the leather-jacket, in which latter instance a marked increase and



decrease can be traced. During the present year, leather-jackets have been found in great abundance. The increased ultra-violet light and humid atmosphere of sunspot maximum years are ecologically more favourable to many pests than the hotter and drier conditions concurrent with years of sunspot minima.

Sheep parasites.—Small round worms which infest the alimentary canal cause general loss of condition. The eggs of the worms are passed to the ground along with the sheep's faeces ; and the infective larvae are picked up by other sheep in the course of grazing. Scab-mites of sheep have been exterminated in Scotland by the use of a benzene hexachloride dip, of which one application is sufficient. There is a fly which squirts its larvae into the nostrils of sheep, where they live until sneezed out by the animals. Green blowflies deposit their eggs in the wool and feed on the flesh, but this pest has been greatly reduced by dips containing DDT. The most serious pest of hill sheep at the present day is the Sheep Tick, which is involved in the transmission of three fatal or severely debilitating diseases. The bloodsucking ticks attach themselves to sheep (and cattle) in March, April and May ; and as this infestation coincides with the lambing season, these pests are difficult to combat. After feeding for eight or ten days the female ticks drop to the ground again, where they deposit from five hundred to two thousand eggs from each individual. Of these, only one per cent. may reach maturity. The life history extends over three years.

During the last ten years, chemists have made rapid advances in the "discovery" of synthetic pesticides. For effective spraying, new and efficient machines are essential.\* An unfortunate circumstance is that most of these potent aids to pest-control also destroy beneficial insects.

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\* Some of the latest models for use in the field and orchard were shown on the screen. There were also shown lantern illustrations of different types of countryside representative of the ecological conditions associated with the various pests of sheep, and the effect of these pests upon the animals.



## PHASE CONTRAST MICROSCOPY

By W. G. Hartley, B.Sc., F.R.M.S.

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(Read 5th April, 1949)

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Since I had the honour of addressing the Society in 1943 there have been noteworthy developments in Microscopy, of a fundamental nature. This evening I propose to deal with the system commonly called "Phase Contrast Microscopy."

Phase Contrast is a new development, the purpose of which is the production of a visible image from objects which in conventional circumstances do not yield one. Such objects are those which only exhibit small or gradual changes of refractive index in their structure, and these comprise living cells, aggregates of detrital minerals, and other specimens, whose nature renders them practically invisible unless subjected to various more or less destructive biochemical treatments.

In order to explain the principle involved, it will be necessary at the start to recapitulate the means by which the ordinary microscopical image is formed. The ordinarily accepted explanation of this was first put forward by Prof. Ernst Abbé, of Jena, in 1874, and although frequently attacked and misrepresented, the theory of microscopic vision associated with his name has stood the test of time, and indeed is universally assumed by its opponents. Essentially it is simple. A ray of light striking a point in the object is thereby separated into different portions. One of these continues as though there had been no object, but the others are deflected from this direct beam, through angles dependent on the wavelength of the light and the fineness of the object structure. The image is formed by interference between these diffracted rays and the direct one, with which they are reunited in the image (Fig. 1).

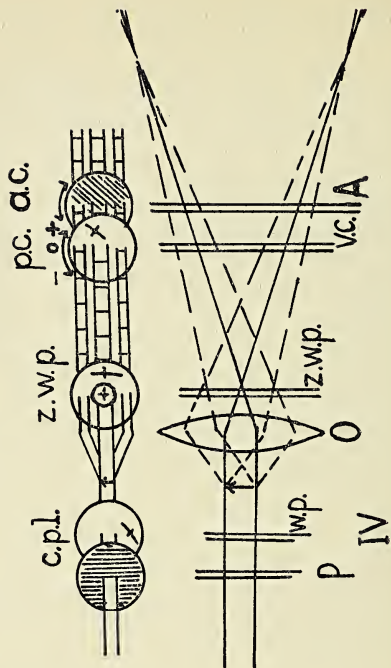
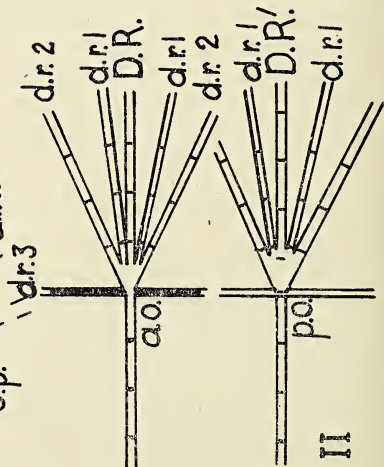
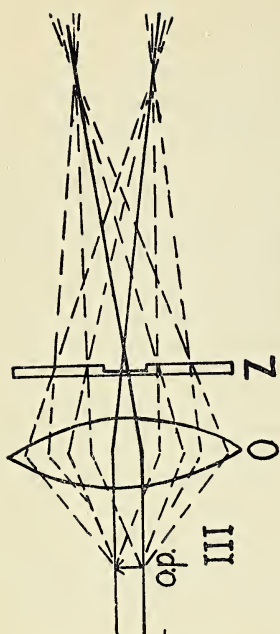
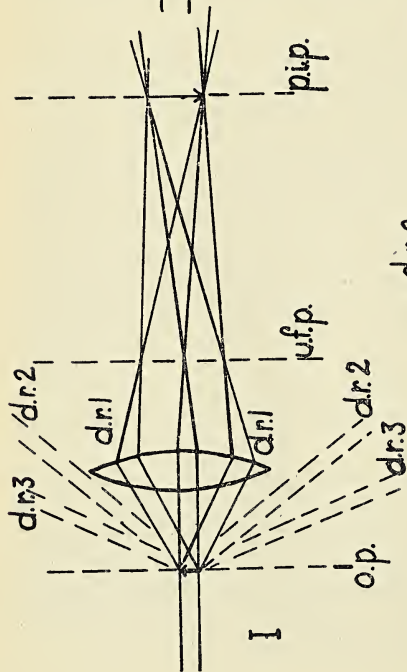
The image can never be a complete and exact reproduction of the object, but approaches more and more closely to this condition in proportion to the number of diffracted rays that can be re-united in the image. This explains the value of large aperture in objectives, as these diffracted rays are deflected through angles which may embrace more than a hemisphere, and the greater the grasp of the objective, the more will be gathered into the image. Every microscopist is familiar with the appearance of these diffracted rays as

spectra in the back of the objective; they are especially common when diatoms are being studied.

Abbé supported his calculations with experiments on the images of lines ruled through silver deposits, and showed to the satisfaction of all competent physicists that the light vibrations in the direct ray were either in the same phase as those in the diffracted rays, or in the reverse phase, so that interference when they were reunited in the image would produce the differences in intensity which made the image visible. In either case, these rays must be reunited in their original phase relationships if they are to yield a true picture of the object; this is the explanation of tubelength and coverglass correction, which are intended to ensure that all rays travel an equal optical distance. If these phase relationships are disturbed, the image ceases to resemble the object—for instance, in dark ground illumination, where the direct rays are excluded from the image, the results are familiar to all. Julius Rheinberg in 1904 showed before the Royal Microscopical Society that by interfering with the phase relationships, or by suppressing diffracted rays, the image of a typical grating could be reversed, black for white, or distorted. This demonstration had an inhibiting effect on microscopists; it seemed that, though they might be scientists, they were still afraid of ghosts.

Homogeneous immersion lenses were introduced in 1877, and with them the necessity for a mounting medium having a refractive index at least equal to their aperture. Canada Balsam was already in use, but was found to be unsuitable for diatoms, because the practical identity of refractive index between the object and its mountant caused them to vanish. The Journals of the early eighties make continual reference to objections, paradoxes, and misunderstandings of the problem. Stephenson, who invented homogeneous immersion, and others, devised mountants of very high refractive index to recover the lost visibility; oddly enough, the diffraction spectra were still brightly visible in the objective, but the balsam-mounted diatom produced a feeble image, whereas the greater aperture of the objective had been expected to yield a firmer picture.

The explanation was not found till 1932, when the Dutch physicist, F. Zernike, proved that if the object consists of a transparent grating and not a black and white one, the direct and diffracted rays are no longer in a relationship which permits them to interfere in the image with the production of a brightness image—they produce a pattern of varying phases, which the eye cannot distinguish (Fig. II.).



## KEY TO DIAGRAMS.

A. Analyser; a.c. amplitude control; a.o. amplitude object—transparent and opaque; c.p.l. circularly polarized light; D.R. Direct Ray in Phase; D.R. / Direct Ray partly out of Phase; d.r. diffracted ray; O. Objective; o.p. object plane; P. Polariser; p.c. phase control; p.o. phase object—variations in refractive index or thickness; p.i.p. primary image plane; u.f.p. upper focal plane of objective; v.c. variable compensator or  $\frac{1}{4}$ -wave plate; w.p.  $\frac{1}{4}$ -wave plate; Z. Zernike Disc; z.w.p. zonal  $\frac{1}{4}$ -wave plate.

Fig. I.—Path of rays through an objective, the first order diffracted rays interfering with the direct beam to form an image. The aperture of the objective is inadequate to grasp the second and third order diffracted rays, which are lost.

Fig. II.—Comparison of the amplitude object in normal microscopy with the object in the phase contrast system.

Fig. III.—Phase relations of direct and diffracted rays altered by difference in light path.

By altering the path of the direct light by a quarter of a wave-length with respect to that of the diffracted light, the rays are brought to interfere as though the object were opaque instead of transparent.

Fig. IV.—The Phase Contrast System as described.



In the interval, various means had been used to secure visibility. Staining had become an art of biochemical significance, with a grave limitation—a living nucleus would not stain. Darkground illumination was well known, and Rheinberg in 1894 had introduced a modification of it, Differential Colour Illumination, but neither of these was much use unless a perceptible difference of refractive index existed between the object and its surroundings. If the specimen did not reflect or otherwise scatter the light, the darkground image was poor. Moreover its effect was to show certain parts of the specimen more readily than others, so that the microscopist had to resist the temptation to look at it as a picture, and instead to ask himself "What does this mean?" Between 1880 and 1890, despite the introduction of completely corrected substage condensers of enormous aperture, the literature shows a steady spate of oblique illuminators, catadioptric systems, semi-cylinders, prisms, buttons, diatomscopes, swinging substages, and similar apparatus designed to obtain asymmetric lighting. Most of these were intended for diatom resolution, and display a perverse ingenuity which compels admiration.

Rheinberg invented his Differential Colour Illumination in 1894 to enhance visibility. It was in two forms; the low power system took the form of a transparent filter held in the substage stop ring, which had a central circle of colour complementary to that of the periphery. Consequently, direct light of the colour of the centre entered the objective and formed a background, whilst the periphery illuminated the specimen in complementary colour, and showed it in colour contrast against the background. This is an exceedingly useful method of illumination. The high-power system was constructed differently, a similar filter being inserted at the back of the objective, and the illuminating cone restricted to such an extent that the direct light all passed through the central area, whilst much of the diffracted light passed through the peripheral zone. Rheinberg made these filters by using collodion-coated coverslips suitably stained, the peripheral part on one side of the cover and the axial disc on the other. This is noteworthy because he must undoubtedly have introduced phase differences between the portions of the beam. He certainly did so deliberately, with mica slips, but did not obtain results which he then considered worth publishing. The firm of Zeiss was greatly interested and collaborated with him in this research.

This might be considered as the perfect example of a discovery missed through the lack of adequate theory. Rheinberg was a scientific microscopist of high standing, but nobody

suspected that Abbé's analysis of the phase relationships was incomplete. It was forty years before Zernike published his calculations, which provided the essential guidance for further advance. This was the discovery that completely transparent objects yielded diffracted rays which were incapable of dimming the direct ray, although they could produce an image which was not visible.

Zernike overcame this by introducing an intentional phase-difference between the direct and the diffracted rays. This sounds at first an extremely difficult undertaking, but in fact it is not so. As we have seen, the direct and diffracted rays are segregated at the back of the objective, in its upper focal plane, and at this level a disc is introduced which has its surface etched away to such a depth that the path of the direct rays and that of the diffracted rays differ by a quarter of a wavelength (Fig. III). This path difference affects all the diffracted rays with respect to the direct ray. This being so, the rays uniting to form the image do so in the phase relationship which would have obtained if the object had been a black and white one, and consequently they produce a picture in colour contrast. If the direct ray is advanced, the image shows deeper tones where the refractive index is higher ; if the diffracted rays are advanced, the image is reversed.

To eliminate the undesirable effects of a narrow illuminating cone, Zernike employed an annular stop below the condenser, accurately imaged upon an annular phase-changing zone in the post-objective disc. On 13th March, 1934, he demonstrated this before the Quekett Microscopical Club. Julius Rheinberg, who had so narrowly missed the discovery forty years before, described it as an interesting experiment in physics, but unsuitable and very dangerous for microscopists to apply, as whilst lines or spots could be made to appear dark or vice versa, it was impossible to obtain a safe and reliable interpretation of the image. He mentioned his own experiments on the adjustment of the phases, but concluded that no reliance could be placed on the images in these circumstances. Zernike was thanked for his very interesting communication. In the previous year he had taken his invention to the firm of Zeiss, and met with a frigid reception. If the invention were of any use, they would surely have discovered it themselves long ago ; they did not propose to ruin the fine corrections of their objectives. However, they thought better of it, and commenced manufacture in 1939.

It would be well at this stage to describe a typical phase contrast microscope. The essential peculiarity is the retarding

zone in the objective, produced by a process similar to lens-blooming. This area encloses a ring-shaped zone, or constitutes a ring, according as the objective is intended to produce positive or negative phase contrast effects. The terms positive phase contrast and negative phase contrast are applied respectively to the conditions where higher R.I. in the object is represented by (1) darkness and (2) brightness in the image. In any case, it is the ring which is illuminated, and this has a thin coating of aluminium to absorb some of the direct light, because this enables the image to be seen more readily by eliminating some of the unnecessary background illumination.

The retarding pattern is normally deposited on one of the lens surfaces, preferably an internal face of a cemented combination, for protection.

Illumination is effected by a low-aperture condenser—high aperture illumination is unnecessary here, because the phase ring is commonly half the diameter of the objective, so that an oil immersion lens with an aperture of 1.3 would only require a numerical aperture of 0.8 in the condenser for this purpose. The condenser is fitted with an annular diaphragm in such a position that its image is exactly superimposed on the phase ring when the instrument is focussed. To adjust this, an auxiliary microscope for studying the objective is usually supplied, and this replaces the eyepiece whilst setting up. A built-in Bertrand lens, such as is used in petrological microscopes, would have great advantages over the present system in this matter.

The hollow illuminating cone does not produce a ring-shaped field of view, as the specimen lies at its apex. This form of illuminating cone is excellent for resolution.

The uses of this system are manifold. One of the interesting results of its application is the discovery that cell structures previously found only after staining can be seen in the living state. In fact the questionable effects of fixatives can be studied for the first time. The ability to study tissue fresh instead of after hours or months of treatment takes the microscope from the pathology laboratory into the operating theatre.

A point worth noting is that, as the phase plate changes the relationship of the rays diffracted by transparent objects to allow them to interfere, so it must change the relationship of those emanating from black and white objects, tending to cause them to disappear. That this does not occur in practice is due to the circumstance that pure phase and pure absorption



objects are very rare in nature, so that the images are somewhat mixed in any case.

In 1946 I was engaged in research in which it appeared likely that the new technique might be useful, and it seemed to me that the whole effect could be attained very simply and flexibly by using polarized light. By this means a completely adjustable system could be made, in which the difference of phase and the degree to which the direct light is obstructed could be adjusted without interrupting observation. One could pass from normal to positive or negative phase-contrast, darkground, and back, and adjust the transmission of light to the specimen in question.

It is a property of certain crystals that they present different refractive indices to polarized light in different planes of polarization. This fact is familiar to microscopists, who use mica or selenite quarter-wave plates, which are crystals of such a thickness that a phase difference of one quarter of a wavelength is produced between initially cophasal rays striking the crystal in certain orientations.

It is clear that if the direct and diffracted rays are polarized perpendicularly to each other, passage through a quarter-wave plate can be made to produce either positive or negative contrast, or neither. It is necessary to pass the rays through an analyser to see the effect of this, and rotation of the analyser has the effect of altering the relative intensity of the direct and diffracted rays.

Furthermore, the quarterwave plate can be replaced by a compensator capable of yielding a variable retardation; calculation and practice agree that a phase difference of a sixth to a quarter of a wavelength is the most useful, but there was a special reason why I wanted to be able to vary this amount.

There are several ways in which the intended result can be attained, but a simple one is to illuminate the specimen with circularly polarized light, and to use a zonal quarter-wave plate above the objective, to convert the circular polarization into two mutually perpendicular planes. The compensator can be put anywhere between this and the analyser, which may be above the eyepiece (Fig. IV).

Those who enjoy making experiments in microscope optics will find that phase discs for this purpose can be fairly readily made from cellophane or selenite, and mounted between coverslips. The use of a selenite stage under the specimen produces results similar to those obtained with a variable compensator in the tube, and is generally more readily applied to biological microscopes than a compensator, as well as being available cheaply at instrument dealers.



## THE ADAPTATIONS OF FRESHWATER GASTROPODA

By W. RUSSELL HUNTER, B.Sc., F.G.S.

(Read 13th December, 1949)

THE environment afforded by freshwater usually lacks the permanence of that of land or sea, and, therefore, the adaptations of such freshwater animals as the gastropods to their habitat are of particular interest. The transitory nature of the environment is, perhaps, responsible for the survival of recognisable degrees of adaptations forming functional and morphological series.

Theoretically, a new and isolated body of freshwater could be colonized by animals, either from the land or from the sea. In fact, the freshwater snails of the present day fall into two divisions: first, the few families of the **Prosobranchia**, the so-called operculate snails, which are the immediate descendants of marine, littoral, gill-breathing forms; and second, the families of the **Basommatophora**, whose closest living relatives are the land-dwelling pulmonates, the air-breathing, true land snails.

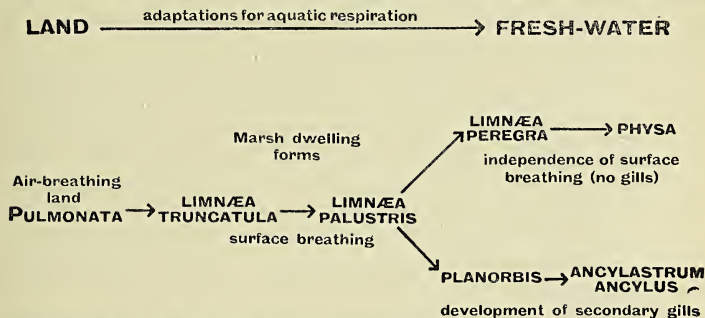
The adaptations shown by freshwater snails may be considered as "Primary" or "Secondary"; the primary adaptations being, on the one hand, that which allows the operculate snails to resist the lower salinity of a freshwater environment and, on the other, those which allow the air-breathing stock to live under water. Adaptations considered as secondary are those which allow the colonization of a particular "ecological niche" of freshwater (*e.g.* peculiar feeding habits, or organs of attachment which permit survival in swiftly flowing streams).

Thus the primary adaptation of the operculate snails is that which permits the passage from sea to freshwater, surmounting the difficulties of maintaining the internal concentration of salts essential to life, in an environment where these salts are present in greater dilution. Once this *euryhaline* adaptation is acquired, the rapid colonization of freshwater is possible. The detailed account of the changes in distribution of *Paludetrina jenkinsii* in historic times exemplifies this. Other examples may be quoted, including the post-glacial history of the genus *Theodoxus* (= *Neritina*).

Secondary adaptations, concerned with feeding methods, are found in old-established freshwater genera; recent work on the genera *Viviparus* and *Bithynia* is of interest in this respect. But, the greatest degrees of secondary adaptations are found in the most ancient bodies of freshwater, those where the environment provided has not had the transience of other lakes and rivers, and where peculiar, highly-adapted proso-

branches are found. Such waters include Tanganyika, Baikal, Ochrida and certain lakes in Celebes. The species in such lakes parallel marine forms in the complexity of their adaptations to particular niches.

Less work has been done on the primary adaptations of the **Basommatophora** which allow members of this initially air-breathing stock to live in freshwater. In my present studies, I regard these adaptations as forming two divergent series ; these



are illustrated in the figure, which, it should be noted, does not necessarily reflect phylogeny. The least adapted limnic pulmonates are those like *Limnaea truncatula*, living in shallow puddles and marshes, which breathe air obtained by surfacing. Lengthy immersion in water drowns such species. *L. palustris* can be regarded as being more aquatic, but is again limited to small bodies of freshwater by the necessity to surface for air. *L. peregrina* is more widely distributed, colonizing larger lochs, besides streams and ponds. At low water temperatures (i.e.  $< 12^{\circ}\text{C}$ ) it can obtain sufficient oxygen, without surfacing, by cutaneous respiration and gas exchange through the bubble in its pulmonary cavity. At higher temperatures, the necessity to surface is partly responsible for seasonal migrations, such as those which have been studied on the shores of Loch Lomond.\* Other forms, including the genus *Physa*, can live submerged throughout their lives.

On the other hand, some forms have become adapted by the development of gills. All the pulmonates, including the **Basommatophora**, form a stock which lost their gills when they developed lungs. The gill in the **Basommatophora** cannot be homologized with the gill of other gastropods, being secondarily developed from a lobe of the anus. This "lobe-gill" is present in a rudimentary form in *Limnaea palustris*, and in such genera as *Planorbis*, *Ancylus* and *Ancylastrum* is well developed, with complete afferent and efferent circulation. These last snails live submerged, and show more elaborate secondary adaptations, e.g. for attachment in streams, and for feeding in specialized habitats.

\* A full account of this work will be published elsewhere.

## SOME INSECTS OF CAMBUSLANG, near GLASGOW

By D. M. Lothian

*(Read 9th May, 1949)*

I should like to speak in the first place of the manner in which I became interested in Entomology, since from my early blunders I learnt many things invaluable later, none of which could be learnt from books.

Towards the end of 1942 I obtained from the local library a book which aroused my interest with its fine coloured plates and lucid descriptions. The book was South's "Butterflies of the British Isles," and this I read from cover to cover until I thought that what I did not know about British Butterflies was not worth knowing. With Spring came disillusionment. The winter months had been spent in preparation of equipment and, towards the end of January, I was out in search of hibernating larvae. None was to be found, however, until, after a month's intensive and unwearied search, I came across what appeared to be a web of Red Admiral Caterpillars. This I found among the upper leaves of the nettle and further investigation showed quite a number of others. These larvae were about  $\frac{1}{4}$ " long, in colour a clear grey with numerous black warts, from which arose short hairs dark in colour and forked at the tip. The head was blackish in colour, in many respects not unlike the young Red Admiral larvae. I had no doubt of their identity. They were transferred to breeding cages and carefully watched. Even after some weeks, when no speedy growth was perceptible, they were still in my opinion Red Admiral larvae. They pupated when about  $\frac{1}{2}$ " long and it was only then that I realised that something strange had happened to my "Red Admirals." In about 14 days emerged a small brown moth about  $\frac{1}{2}$ " across the wings, the identity of which I have not yet ascertained. I learnt from this that one must approach an unknown species with an open mind. To attempt to describe a specimen with a particular species in mind, will only lead to the observer seeing characteristics which are not really there and the eventual deduction of the wrong identity. Of course, had I studied the life history of the Red Admiral carefully, I would have discovered that the larvae are unable to hibernate in this country. Indeed, I have never found a single Red Admiral caterpillar, and, as a point of interest, I would like to hear if any one present has.

At this stage I decided I had better become acquainted with the British Moths, and South's two volumes were obtained. One day while out walking I noticed something white



on a wall. This proved to be a specimen of the Broad-barred White Moth (*Hecatera serena*). I stood and marvelled at the perfection of camouflage and the insect's beautiful synonymy with the background, which at first sight appeared unsuited to it. Another daily resting place for this moth is on top of a projecting nail on a fence post. In this position it appears like a piece of bird excrement. South states that the Broad-barred White Moth is little known in Scotland. In my opinion the scarcity is not of the moth, but of the entomologists to discover it. After finding that specimen, I became aware that to an observing eye, sites such as walls, tree trunks and fences were rarely without some insect of interest. Species such as the Grey Chi Moth (*Polia chi*), the Dark Dagger Moth (*Acronycta tridens*) and the Dark Arches Moth (*Xylophasia monoglypha*) all pass the daylight hours in fairly exposed positions. One specimen which I found on a wall shewed an interesting example of the workings of Natural Selection. This was a melanic or black specimen of the Peppered Moth (*var. double dayaria Biston betularia*). It is obvious that insects such as these which rely on the protection that the colouring of their wings afford will be in danger if they tend to vary from the type form or if the environment is of a different nature. The latter is the case with the specimen just instanced. It has been found that in many areas where walls, etc., are liable to discolouration by smoke and soot, certain species eventually become darker in colour. They are then more in accord with their surroundings and escape the attention of predatory animals and insectivorous birds. This phenomenon is known as industrial melanism and this species was first found, I believe, in the Midlands of England, but in Cambuslang I find it is supplanting the type form almost entirely.

Later in the year I was thrilled with my first sight of that brilliant little gem, the Small Copper Butterfly (*Lycaena phlaeas*), resting on a flower, its beautiful burnished wings open to the sun. Then it was off like a flash of light to another flower. This habit is characteristic of both this species and the Common Blue Butterfly (*Polyommatus icarus*) which is the only other representative of the family *Lycaenidae* found in Cambuslang.

Perhaps the most interesting family of Butterflies found around Cambuslang is the *Nymphalidae*. The species found are:-

- Red Admiral (*Vanessa atalanta*).
- Small Tortoiseshell (*Aglais urticae*).
- Painted Lady (*Vanessa cardui*).
- Peacock (*Nymphalis io*).



All four are extremely elegant creatures with beautifully contrasted colours. The Red Admiral is uncertain in its occurrence, being unable to survive the winter here and therefore its appearance is entirely dependent on migratory insects arriving in Britain each year. The butterfly itself is brilliantly coloured with black, red and white and the underside of the wings is a study in intermingled shades of brown, salmon pink and white with a shading of violet throughout.

The Painted Lady is even more uncertain and two seasons have passed now since I have noted the species in Cambuslang, so that it is a rather unfamiliar if welcome visitor. The Small Tortoiseshell Butterfly is invariably the first to gladden the eye in Spring and, although common, is one of our prettiest British Butterflies: in contrast the underside of the wings is brown and rather sombre. The insect seems capable of doing a disappearing act when it suddenly closes its wings after sunning itself on a gravel path, as it is fond of doing.

Perhaps the most aesthetically satisfying of all is the Peacock Butterfly. Its range has increased remarkably and it is now almost as common as the Small Tortoiseshell in Cambuslang and district. This is definitely an acquisition to the insect fauna of the area. This species, too, is dark brown on the underside which must be protective in its winter sleep under wood piles and similar hibernating haunts. I will make no attempt to describe this beautiful insect, but I have included a specimen of this and other species mentioned this evening for the benefit of those who may be unfamiliar with them.

An interesting incident involving these species occurred on the 9th September, 1945. I happened to notice some specks of colour on the trunk of a hawthorn tree: closer inspection showed several Red Admirals in company with wasps and one Small Tortoiseshell imbibing the sap which was exuding from the bark. They were intoxicated, allowing handling without any attempt to fly away, and merely rested wherever they were placed. I have not seen this habit mentioned elsewhere in entomological literature.

A group of Butterflies sparsely represented in Cambuslang is the Satyridae. Only two of the eleven British species are to be found. One of them, the Meadow Brown (*Maniola jurtina*) is our commonest non-migrating butterfly. It is probably known by sight to every one present—a rather dowdy brown insect which flies lazily both in sunshine and dull weather. It is, therefore, pre-eminently suited to our Scottish climate. The occurrence of the other member of the group, the Small Heath (*Coenonympha pamphilus*) has puzzled

me. I have met with it once only : one specimen found on the grassy verge of a road. It is not a rare insect in the rest of Scotland, but for some reason I have not found it in Cambuslang, but for that solitary example.

The remaining group of butterflies represented is the Pieridae. The members of this group are too well known to need description and I shall name the species found and let that suffice. The three common white butterflies are found in their varying degrees of abundance—the Large White (*Pieris brassicae*), the Small White (*Pieris rapae*), and the Green-veined White (*Pieris napi*), the first two gaining their usual garden notoriety and the last suffering because of its resemblance to them.

The moths are well represented in the area, and I have time only to deal with two groups : the sub-family Arctiinae, popularly known as the Tiger Moths, and the Plusia Group of the Noctuidae. In the first-mentioned group, the insects are brightly coloured, or at least the majority of them are, and stout bodied. The caterpillars have a dense clothing of hair. The well known woolly bear caterpillar, often seen in gardens, is the larva of the Garden Tiger Moth (*Arctia caja*). Of the fifteen British species three are found in Cambuslang. These are :—

White Ermine (*Spilosoma menthastris*).

Buff Ermine (*Spilosoma lubricipeda*).

Garden Tiger (*Arctia caja*).

Both the White Ermine and the Buff Ermine are pretty common in the area and are to be found resting on the underside of herbage—often nettles—and rarely attempt to fly during the day even when disturbed. Neither is particularly brightly coloured, but the origin of the English name of Ermine is obvious.

The Garden Tiger Moth is colourful—red, blue, brown and white. It varies in size from about one inch wing span to nearly two inches and rests by day among nettles and low growing and fairly dense plants. It is one of the easiest insects to rear since the caterpillar will eat almost any low growing plant, although nettle and dock are the usual food plants. Given plenty of these, the larva will complete its metamorphosis in a few months. Any one who has perhaps never attempted rearing lepidoptera would find this species an easy and instructive one with which to start. The Garden Tiger also presents a good example of warning colours as a protective device.

Coming to the Plusias, four of the twenty British species are found in Cambuslang :—

Silver Y. (*Plusia gamma*).

Gold Spangle (*Plusia bractea*).

Burnished Brass (*Plusia chrysitis*).

Snout (*Hypona proboscidalis*).

There are probably more within the area, which I have overlooked. Since the first three species mentioned are migratory in tendency, particularly the Silver Y (*Plusia gamma*), the occurrence and abundance varies quite considerably. Not so the Snout Moth. It occurs in varying abundance year after year along with another species of another family, the Shaded Broad-bar (*Ortholitha limitata*). In fact the one is rarely found without the other. A species of the *Plusia* Group I shall not be surprised to see is the Golden *Plusia* (*Plusia moneta*); it has been recorded with increasing regularity in Scotland.

The lesser known orders of insects, too, are extremely interesting, and of these the Odonata, or Dragonflies, and the Neuroptera, which includes the Lace-wing Flies, are represented in Cambuslang. Most people know what a dragonfly looks like and some regard it with marked respect, being of the opinion that such a ferocious looking creature can do no less than attack at sight. For all its appearance, however, it is harmless to man, its strong jaws being adapted for seizing and devouring insects. The Odonata are divided into two sub-orders—firstly Anisoptera, or Hawker Dragonflies, which may be known by their larger size and the fact that when resting the wings are held outspread at right angles to the body. One species is found in the area, namely, *Aeshna juncea*, which is, by the way, an extremely difficult species to catch. It is able to travel at a speed of between 30 and 40 m.p.h., which is rather higher than that of even the most athletic entomologist. The second and last sub-order is the Zygoptera, or Damsel Flies, which are weak in flight and rest with their wings together above their body. Three species are found in Cambuslang :—

Large Red Damsel Fly (*Pyrrosoma nymphula*).

Common Coenagrion (*Coenagrion puellum*).

Common Ischnura (*Ischnura elegans*).

Finally, the Neuroptera, of which I will deal with only one species. The Gold-eye Lace-wing Fly (*Chrysopa carnea*) is common everywhere near water, and is certainly an elegant and quite attractive insect.

Many people are of the opinion that insects other than Butterflies are rather undesirable pests; things to be left severely alone. Many would never dream of going in search of them. On the contrary, Entomology is an intensely interesting study.



LIST OF FIRST ARRIVALS OF SUMMER BIRDS IN  
CLYDE AREA IN 1949 AND 1950, COMPILED FROM RE-  
PORTS OF MEMBERS AND FRIENDS

BY THOMAS ROBERTSON

| <i>Average<br/>Date<br/>over<br/>55 years</i> | <i>Bird</i>                  | <i>Year 1949</i>  |                 | <i>Year 1950</i>  |                 |
|---|------------------------------|---|-----------------|---|-----------------|
|   |                              | <i>Date</i>   | <i>Locality</i> | <i>Date</i>   | <i>Locality</i> |
| Mar. 11                                       | Lesser Black-<br>Backed Gull | Jan. 3—Helensburgh<br>Feb. 26—Richmond Park<br>Mar. 12—Dunoon |                 | Jan. 15—Helensburgh<br>Feb. 28—Glasgow Harbour<br>Mar. 1—Richmond Park            |                 |
| Mar. 25                                       | Wheatear ...                 | Mar. 28—Southend<br>April 3—Fairlie<br>April 4—Summerston     |                 | Mar. 24—Southend<br>Mar. 28—Dalry<br>April 6—Fairlie                              |                 |
| April 4                                       | White Wagtail                | April 10—Largs<br>April 14—Motherwell                         |                 | April 18—Largs<br>April 28—Richmond Park  |                 |
| April 8                                       | Chiffchaff ...               | April 3—Southend<br>April 4—Largs<br>May 1—Darvel             |                 | Mar. 26—Southend<br>April 7—Kilmarnock<br>April 15—Dalry<br>April 15—Rossdhu      |                 |
| April 9                                       | Sand Martin                  | April 6—Kilmarnock<br>April 9—Lochwinnoch<br>April 13—Largs   |                 | Mar. 26—Motherwell<br>April 8—Helensburgh<br>April 12—Cumnock                     |                 |
| April 10                                      | Swallow ...                  | April 8—Kirn<br>April 10—Dalry<br>April 12—Torrance           |                 | April 5—Dunoon<br>April 8—Motherwell<br>April 14—Dalry                            |                 |
| April 12                                      | Willow Wren                  | April 3—Southend<br>April 10—Fairlie<br>April 11—Helensburgh  |                 | Mar. 27—Southend<br>April 17—Dalry<br>April 19—Newlands<br>April 19—Richmond Park |                 |
| April 13                                      | Common<br>Sandpiper          | April 13—Helensburgh<br>April 16—Darvel<br>April 16—Largs     |                 | April 8—Southend<br>April 11—Dunoon<br>April 15—Motherwell                        |                 |
| April 21                                      | House Martin                 | April 15—Helensburgh<br>April 20—Largs<br>April 21—Dumbarton  |                 | April 14—Kilmarnock<br>April 26—Largs<br>May 3—Dumbarton                          |                 |
| April 21                                      | Yellow<br>Wagtail            | April 23—Lochwinnoch<br>April 30—Motherwell                   |                 | April 29—Lochwinnoch  |                 |



| <i>Average<br/>Date<br/>over<br/>55 years</i> | <i>Bird</i>                     | <i>Year 1949</i>  |                 | <i>Year 1950</i>  |                 |
|---|---------------------------------|---|-----------------|---|-----------------|
|   |                                 | <i>Date</i>   | <i>Locality</i> | <i>Date</i>   | <i>Locality</i> |
| April 22                                      | Cuckoo ...                      | April 20—Dunoon<br>April 20—Largs<br>April 26—Darvel            |                 | April 27—Rosneath<br>May 1—Helensburgh<br>May 1—Largs<br>May 1—Stevenston |                 |
| April 23                                      | Tree Pipit ...                  | April 16—Darvel<br>April 19—Helensburgh<br>April 30—Skelmorlie  |                 | May 3—Darvel<br>May 6—Skelmorlie<br>May 7—Gartocharn                      |                 |
| April 25                                      | Corncrake ...                   | April 27—Southend<br>April 30—Largs<br>April 30—Motherwell      |                 | May 3—Dalry<br>May 3—Giffnock<br>May 6—Southend                           |                 |
| April 26                                      | Redstart ...                    | — —No timeous report  |                 | May 5—Garscube  |                 |
| April 28                                      | Whinchat ...                    | April 27—Southend<br>May 2—Helensburgh<br>May 3—Largs           |                 | April 12—Helensburgh<br>May 4—Southend<br>May 6—Kilmarnock                |                 |
| May 2   | Common<br>Whitethroat           | April 23—Darnley Glen<br>April 30—Torrance<br>May 1—Kilmarnock  |                 | April 14—Largs<br>May 5—Carmunnock<br>May 5—Dalry                         |                 |
| May 2   | Sedge Warbler                   | April 26—Helensburgh<br>May 1—Kilmarnock<br>May 2—Possil Marsh  |                 | May 3—Kilmarnock<br>May 4—Dalry<br>May 4—Southend                         |                 |
| May 2   | Swift ...                       | May 7—Largs<br>May 12—Dumbarton<br>May 12—Richmond Park         |                 | May 4—Bearsden<br>May 4—Eaglesham<br>May 5—Dumbarton                      |                 |
| May 3   | Wood Wren                       | April 24—Pollok Park<br>May 1—Darnley Glen<br>May 2—Helensburgh |                 | May 7—Carmunnock<br>May 8—Cumnock<br>May 13—Kilmarnock                    |                 |
| May 5   | Grasshopper<br>Warbler ...      | May 16—Lochwinnoch  |                 | May 4—Drymen<br>May 7—Helensburgh<br>May 27—Lochwinnoch                   |                 |
| May 8   | Terns<br>(Common<br>and Arctic) | May 7—Fairlie<br>May 8—Southend<br>May 13—Bothwell Bridge       |                 | April 22—Southend<br>May 10—Lochwinnoch<br>May 13—Bute                    |                 |
| May 9   | Garden<br>Warbler ...           | May 11—Lochwinnoch<br>May 13—Bothwell Bridge<br>May 15—Darvel   |                 | May 10—Cumnock<br>May 13—Milngavie<br>May 14—Darvel                       |                 |
| May 11  | Blackcap ...                    | May 7—Bothwell Bridge<br>May 22—Darvel                          |                 | May 6—Braidwood<br>May 30—Darvel  |                 |
| May 11  | Spotted<br>Flycatcher           | May 14—Fairlie<br>May 21—North Bute<br>May 22—Linn Park         |                 | May 13—Kilmarnock<br>May 13—Torrance<br>May 15—Bothwell Bridge            |                 |

## NOTES FROM THE SOCIETY EXCURSION REPORTS

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MILLPORT AND MARINE BIOLOGICAL STATION—18TH APRIL, 1949—*Leader*, DR. PATTON.

17 members attended.

Dr. Orr outlined the history of the Station and the work at present being carried out there. Reference was made to the important work done by the late Mr. Richard Elmhirst whose loss to the station was greatly regretted. The party was conducted through the various research departments and laboratories—Dr. Marshall exhibited and described some of her work. Members were greatly impressed by the “Calanus,” a wonderfully equipped floating laboratory, which had just returned with a party of students who had been out on an expedition. A full description of the vessel is given in the Annual Report of the Scottish Marine Biological Association 1947-8 (pp. 28-29). The party spent a profitable time on field work along the shore, though nothing new was recorded.

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FIELD STATION, ROSSDHU, LOCH LOMOND, 7TH MAY, 1949—*Leader*, DR. H. SLACK.

20 members took part in this excursion.

Dr. Slack conducted the members over the laboratories devoted to the study of the animal life of the loch, exhibiting and explaining the various pieces of apparatus employed in the work which is being carried out by students of the University of Glasgow under his guidance. Much of this work is devoted to a study of the Plankton forms and some of these were shown under the microscope. The abundant insect life of the shore and adjoining woods is also being studied intensively.

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KILMACOLM, 4TH JUNE, 1949,—*Leader*, MR. J. BOYD.

Twelve members explored Glen Moss.

*Meum athamanticum* was in full flower on the drier hillside and in the vicinity were found *Viola lutea* (yellow-flowered form and the blue variety *amoena*), *V. sylvatica* and *V. canina*. In the Moss the cotton grass, *Eriophorum* sp. and bog bean, *Menyanthes trifoliata* were in abundance. A number of sedges were studied:—*Carex ampullacea*, *C. vulgaris*, *C. panicea*, *C. echinata*, *C. binervis* and the very rare mud-sedge, *C. limosa*, which was found to occur here in fair quantity.

A colony of black-headed gulls was observed to be nesting.

DOONFOOT—3RD SEPTEMBER, 1949—*Leader*, Mr. PRASHER.

Six members took part in this excursion.

Some interesting adventive plants were found on the Low Green of Ayr. The Roman wormwood, *Ambrosia artemisiifolia*, seems now to have become established; it was reported by the late Robert Grierson as a casual at Ibrox in 1919, apparently as an incomer from North America, where it is said to be an abundant weed on waste ground. It is a member of the Order Compositae, but the flowers are unisexual and arranged in two quite distinct and different kinds of inflorescence. The plants found on this occasion were in good condition. A small species of mallow, *Malva rotundifolia*, not uncommon in the East of Scotland, but known only as a casual in the West, was seen, and near the same spot a few plants of *Geranium molle* (dove's foot cranesbill) were found and amongst them another species, *G. pusillum* which does not seem to have been previously recorded for Ayrshire. Other plants observed on the Low Green were the stork's-bill, *Erodium cicutarium*, the Isle of Man cabbage, *Brassica monensis*, bladder campion, *Silene inflata*, hare's foot trefoil, *Trifolium arvense*, hemlock, *Conium maculatum*, lesser bindweed, *Convolvulus arvensis*, common bugloss, *Lycopsis arvensis*. The following plants were noted on the banks of the Doon:—A red-flowered species of garlic, *Allium carinatum*, which occurs in abundance, the Canadian burnet, *Poterium canadense*, burnet-leaved rose, *Rosa spinosissima*, great hairy willow-herb, *Epilobium hirsutum*, tansy, *Tanacetum vulgare*, yellow loosestrife, *Lysimachia vulgaris*.

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ABERFOYLE—26TH SEPTEMBER, 1949—*Leader*, Prof. BRAID.

Abundance of fruit upon the blackthorn, *Prunus spinosa*, was noted; some trees of *Populus tremula* and masses of *Corydalis claviculata* amidst the bracken attracted attention.

At Ballochraggan, attempts to grow edible comfrees, *Symphytum asperrimum*, *S. peregrinum*, *S. officinale*, and the giant cow parsnip, *Heracleum villosum* as spring food for hill stock were demonstrated as were experiments in bracken control.

Specimens noted included: *Hymenophyllum unilaterale*, *Lycopodium Selago*, *Festuca ovina*, var. *vivipara*, *Cladonia sylvatica*, *Parnassia palustris*, *Triglochin palustre*, *Drosera rotundifolia*, *Pinguicula vulgaris*, *Utricularia intermedia*.

Of the fungi, the swellings due to *Gymnosporangium* species were abundant on the junipers and the aecidial stages of *G. clavariaeforme* on the hawthorn and *G. Juniperi* on the rowan were plentiful.



TILLIETUDLEM to BRAIDWOOD, 6TH MAY, 1950—*Leader*, Mr JOHNSTONE.

Twelve members were present.

At Craignethan Castle three unusual plants have a footing on the ruins :—Wallflower, *Cheiranthus Cheiri* ; greater celandine, *Chelidonium majus* ; cuckoo pint, *Arum maculatum*.

27 species of plants in flower were noted ; 22 species of birds ; of the migrants, blackcap, swift, willow wren, common sandpiper were noted.

BALLANTRAE and DISTRICT (by Coach), 22ND MAY, 1950—*Leader*, Mr PRASHER.

26 members took part.

Among the plants noted were :—The vernal squill, *Scilla verna* ; bloody cranesbill, *Geranium sanguineum* ; the rock rose, *Helianthemum Chamaecistus* ; soft knotted trefoil, *Trifolium striatum* ; wood vetch, *Vicia sylvatica* ; the great horsetail, *Equisetum maximum*, in unusual abundance ; and a plant of the long stalked cranes-bill, *Geranium columbinum*.

Numerous species of birds were noted—among them oyster-catcher, cormorant, gannet, rock pipit, sandpiper.

MILLPORT, 3RD JUNE, 1950—*Leader*, Mr. BOYD.

Twelve members arrived, according to plan.

Trees and shrubs of Garrison Park were studied. The club palm, a species of *Cordyline*, was in bud—it was not possible to say whether it was *C. australis* or *C. indivisa*. The fan palm, *Trachycarpus Fortunei*, was also noted. In the Aquarium interest was aroused by cuttlefish, starfish and bivalves ; outside, a visit was paid to the tank erected for the cultivation of oysters. Mr. Powell, the algologist, showed the party some of the seaweeds. *Chorda filum* is common, *Gigartina* is commoner than Carrageen moss, *Chondrus crispus*, but has the same food properties as a base for jelly. *Zostera* is coming back on the Fairlie sands. Mr. Powell said that he had seen a glow-worm by the roadside west of the Aquarium four or five days previously. During a walk along the shore the botanists found water crowfoot, *Ranunculus trichophyllus* ; the bog bean, *Menyanthes trifoliata* ; the spotted orchis, *Orchis maculata*.

FLANDERS MOSS, 1ST JULY, 1950—*Leader*, Prof. BRAID.

Ten members took part.

The flora of a peat area was first explored—sphagnum mosses, insectivorous plants, heather, heath, bog myrtle, molinia, sedges and deer's hair and the more local beaked



rush, *Rhynchospora alba*. The beauty of the little fairy cup lichen, *Cladonia coccifera*, with its bright red fructifications and the abundance of its ally the reindeer moss, *Cladonia rangiferina*, were noted with interest. The two cotton grasses and various sedges were obtained but there was no trace of *Andromeda polifolia*. Excellent patches of the fragrant orchis, *Gymnadenia conopsea*, in full flower were much admired as well as many forms of *Orchis maculata* and a few butterfly orchids *Habenaria bifolia*, and *H. chlorantha*. Wall lettuce, *Lactuca muralis*; Sand leek, *Allium Scorodoprasum*; cleistogamous flowers of *Viola sylvatica* and *Lysimachia vulgaris*—the Yellow Loosestrife—were among the most interesting plants noted.

In the Moss a redshank was flushed and various tits and chaffinch were seen in the woods

FAIRLIE to HUNTERSTON, 5TH AUGUST, 1950—Leader, Mr. BOYD.

Eight members were present.

At Fairlie, plants noted were lyme grass, *Elymus arenarius*; sea radish, *Raphanus maritimus*; bugloss, *Lycopsis arvensis*; small nettle, *Urtica urens*; cut-leaved and henbit dead-nettles, *Lamium incisum*, and *L. amplexicaule*.

About 1933, the grass-wracks, *Zostera* species, were almost exterminated by a micro-fungus or virus. At the excursion to Millport this Spring we were informed that some had been seen again on the shores south of Fairlie: a search was therefore made and we were successful in finding a large quantity of the dwarf grass-wrack, *Zostera nana*.

At Southannan, welshed thistle, *Carduus acanthoides*; the double flowered form of the meadow crane's bill, *Geranium pratense*; *Rubus Lindleyanus* were found.

In the salt marsh, sea meadow grass, *Glyceria maritima*; *Juncus Gerardi*, common spike rush, *Eleocharis palustris*, *Scirpus rufus*, iris, *Iris pseudacorus*, gipsy-wort, *Lycopus europaeus*, skull-cap, *Scutellaria galericulata*, bog rush, *Schoenus nigricans*, wolf, hairy and river sedges, *Carex vulpina*, *C. hirta*, *C. acuta* were found. In brackish pools, Sea-blite, *Suaeda maritima*, Glass wort, *Salicornia herbacea*, and celery-leaved crowfoot, *Ranunculus sceleratus* were found.

Near the sand dunes, Stork's bill, *Erodium cicutarium*, mountain groundsel, *Senecio sylvaticus*, and sheep's scabious, *Jasione montana*, were observed. The mosses *Tortula ruraliformis* and *Dicranella heteromalla* were found. Bulrushes, *Scirpus lacustris*, sea club rush, *Scirpus maritimus* were also noted.

Birds noted included gulls, oyster-catchers, tern, curlews, grey and pied wagtails, duck ; the nest of a water hen containing five eggs was observed.

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PITLOCHRY (by Coach), 25TH SEPTEMBER, 1950—*Leader*, Prof. BRAID.

27 members were present.

The party proceeded to the Brown Trout Research Laboratories at Faskally House where the Director, Mr. K. A. Pyefinch and five of his staff guided the members round the laboratories, showed many interesting exhibits and encouraged questions. The baby trout and the older controls in the "Perpex" tanks aroused much interest and the visiting botanists and zoologists were particularly attracted by the material which had been collected from the different lakes and rivers. The Laboratory was established in 1948 by the Scottish Home Department and the North of Scotland Hydro-Electric Board. The aims of the investigations are to devise practical ways of improving the trout fisheries of Scotland and especially to study means by which the trout fisheries of the reservoirs may effectively be developed. The trout itself and its rate of growth, breeding habits and food at different times of the year and in different kinds of habitat are being studied as well as methods whereby the food supplies may be increased.

After leaving Faskally, by the north lodge, a halt was made at the Pass of Killiecrankie some three miles to the north. Here the driver of the bus proved himself to be an excellent guide and pointed out the Wishing Stone, the Queen's View, and the Soldier's Leap. The abundance of *Russula* sp. aroused comment but little else of note was recorded.

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DUMBARTON CASTLE, 2ND SEPTEMBER, 1950—*Leader*, Dr. PATTON.

24 members were present.

Geologists, botanists and ornithologists had excellent opportunities of pursuing the study of their particular subjects. As the Society has had so many outings to this interesting locality nothing new falls to be recorded. It may be noted however that *Smyrniium olusatrum* appeared to be quite free from the rust fungus that affected it in the past.

## Sectional Reports 1949

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### BOTANICAL SECTION (Convener, Mr. Prasher).

Sixteen excursions were carried out as arranged (see handbook) with average attendance of nine members. Of the specimens observed, the following were considered most noteworthy for their occurrence in these "stations":—

Cadzow : *Adoxa Moschatellina* (a striking display).

Rotten Calder Glen : *Claytonia sibirica*, *Carum Carui*, *Neottia Nidus-avis*.

Blackwood : *Ranunculus auricomus*, *Pyrola minor*, *Erinus alpinus*.

Lanark (district) : *Conium maculatum*, *Aethusa Cynapium*.

Cumbræ : *Anagallis arvensis*, *Anagallis tenella*, *Pinguicula lusitanica*, *Juncus maritimus*, *Catabrosa aquatica*.

Tollcross : *Sisymbrium altissimum*, *Melilotus alba*, *Ornithopus perpusillus*, *Campanula rapunculoides*, *Erythraea Centaurium*, *Juncus glaucus*.

Fairlie to Largs : *Senebiera didyma*, *Artemisia Absinthium*, *Ranunculus hederaceus*, *Potentilla reptans*, *Ononis repens*, *Senecio sylvaticus*, *Lycopus europaeus*.

Bishopton to Langbank : *Sagina subulata*, *Potentilla norvegica*, *Solanum Dulcamara*.

Kilmacoll : *Pimpinella Saxifraga*, *Meum athamanticum*, *Lysimachia thyrsiflora*.

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### ENTOMOLOGICAL SECTION (Convener, Mr. Lothian).

An interesting record was made by Mr. Lothian : at Rowardennan, June 22nd, shortly after midnight, three female glow-worms, *Lampyrus noctiluca*, were captured. This species is stated by the B.A. Flora and Fauna 1901 to be local and scarce.

Three excursions were carried out as arranged.

It was noted that migrating vanessids were numerous, the Painted Lady, *Vanessa cardui*, was common, the Red Admiral, *Vanessa atalanta*, was frequent, the Peacock, *Nymphalis io*, is increasing and is almost as numerous as the Small Tortoiseshell, *Aglaia urticae*.



## ORNITHOLOGICAL SECTION

(Convener, Mr. Robertson).

109 separate species of birds were noted at the ten outings. the most interesting were :—

At Lochwinnoch—Whooper Swans, Yellow Wagtail, Blackcap Warbler, Garden Warbler, Goldeneye, Sand Martin (early date).'

At Darnley Glen—Great Northern Diver (Immature), Whitethroat (early).

At Clyde Park, Motherwell—White Wagtail, Yellow Wagtail, Geese, Whooper Swan, Ivory Gull (a rare visitor.)

At Whistlefield—Redstart.

Two pairs of Buzzards nested in North Ayrshire.

## GEOLOGICAL SECTION (Convener, Mr. Cannon).

Four excursions were carried out during the session.

Mr. Kirkwood read a paper on " Continental Drift " to a Sectional Meeting.

## Sectional Reports 1950

### BOTANICAL SECTION.

Thirteen of the fifteen excursions arranged were carried out—those to Possil Marsh and Loch Libo were abandoned. There was an average attendance of eight members. The most noteworthy " finds " were :—

At Garelochhead—*Claytonia sibirica*, *Valerianella olitoria*.

Fannyside Moor—*Trientalis europaea*.

Barassie—*Fumaria Boraei*.

Dundonald—*Ranunculus bulbosus*, *Menyanthes trifoliata*.

Dalry (Tinker's Hill)—*Rosa spinosissima*, *Meum athamanticum*.

Milngavie—*Neillia opulifolia*, *Rhamnus Frangula* (introduced shrubs).

Balmaha—*Rumex longifolius*, *Rubus Lindleianus*, *Lysimachia vulgaris*, *Solanum Dulcamara*.

Stevenston to Saltcoats—*Hordeum marinum*, *Brassica monensis*, *Sagina nodosa*, *Impatiens glandulifera*, *Ornithopus perpusillus*, *Gentiana campestris*.



## ORNITHOLOGICAL SECTION.

Nine outings were carried out, at these sixty-one species of birds were noted. The rarities reported were :—

Montagu's Harrier (*Circus pygargus*), observed by Mr. C. Eric Palmar.

Turtle Dove (*Streptopelia turtur turtur*), observed by Mr. J. Greenlees.

Pied Flycatcher (*musciapa h. hypoleuca*), observed by Mr. Palmar.

Black-Billed Cuckoo (*Coccyzus erythrophthalmus*), observed by Mr. Greenlees.

The first three are of fairly frequent occurrence elsewhere in the British Isles, but this American Black-Billed Cuckoo is only the fourth specimen admitted to the British List. Mr. John Harvey, a shepherd, of Gartnacopaig, Southend, Kintyre, found the dead cuckoo on the east side of Achnaslishaig Hill on 8th November. The bird was identified by Mr. Palmar and Mr. Robertson and confirmed by Mr. MacDonald, Keeper of Birds, British Museum (Nat. Hist.). The skin may be seen at The Glasgow Museum, Kelvingrove. It is in juvenile plumage.

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## GEOLOGICAL SECTION.

The programme of excursions was carried out. The Sectional meetings held on Thursday evenings were well attended. Three papers were read :—

“Continental Drift,” by Mr. Kirkwood (repeated by request).

“An Example of River Erosion,” by Dr. Patton.

“Geology on Holiday,” by Mr. Cannon.

## DIGEST OF THE PROCEEDINGS OF THE SOCIETY

SESSION XIX—1949

*President—*

Prof. KENNETH W. BRAID, M.A., B.Sc., B.Sc.(Agr.), F.R.S.E.

*Vice-Presidents—*

JOHN R. LEE.

DONALD PATTON, M.A., B.Sc., Ph.D., F.R.S.E.

Rev. JOHN WANLESS, F.R.M.S.

*Honorary Treasurer—*

ROBERT H. JOHNSTONE, M.A., 726 Anniesland Road, W.4.

*Honorary Secretaries—*

JEAN C. D. CRAIG, B.Sc., A.R.I.C., 2 Devonshire Gardens, W.2.

PHYLLIS WOODLAND, 112 Maxwellton Road, East Kilbride.

*Librarians—*

JAMES C. GRAHAM, 64 Walton Street, S.1.

ROBERT HODGE, 85 Ashdale Drive, Mossspark, S.W.2.

*Editor of Transactions—*

ERNEST STOLLERY, 51 Allison Street, S.2.

*Members of Council—*

ROBERT MACKECHNIE, B.Sc.

NICOL HOPKINS.

JOHN BIGGAR.

DANIEL M. LOTHIAN.

MABEL G. SCOTT, M.A., B.Sc.

MARGARET G. MCCOIM.

JOHN BOYD.

C. ERIC PALMAR, A.R.P.S., M.B.O.U.

J. INGLIS CAMERON, M.B., Ch.B., F.R.F.P.S. (Glasgow).

*Delegate to the Conference of the Corresponding Societies of the British Association—*

JOHN BOYD.

*British Association Committee—*WILLIAM RENNIE, the President, Vice-Presidents, Hon. Secretaries  
Librarians, Delegate, the Conveners of the Sectional Committees.*Representative to the Committee of the Scottish Marine Biological Association—*

AGNES MEIKLE, B.Sc.(Agr.).

*Representatives to West of Scotland Field Studies Council—*

THOMAS ROBERTSON.

Dr. J. INGLIS CAMERON.

*Trustees—*

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ED. J. A. STEWART, M.A., B.Sc.

*Auditors—*

CHARLES D. MACFARLANE.

JAMES R. WOOD, C.A.

## SOCIETY MEETINGS

11TH JANUARY, 1949.

At this, the first meeting of the session, the President, Professor Walton, occupied the chair.

Mr. George D. Paterson, 65 Smithycroft Road, E.1, was admitted to membership.

Dr. J. Inglis Cameron contributed a final note on the late flowering of the wild strawberry, *Fragaria vesca*, near Castlehill, Bearsden (p. 67).

Mr. James Anderson presented the annual exhibition of the Photographical Section. This included some very fine photomicrographs by Rev. John Wanless, and some excellent studies of birds by Mr. C. Eric Palmar. The following films were exhibited: The Meadow Ant, Protection of Plants, Reclamation of Zuyder Zee, The Spawning of the Bitterling, *Rhodeus amarus*.

8TH FEBRUARY, 1949.

Professor Walton presided at the Annual Business Meeting.

Miss Kathleen J. Baird, B.Sc., 17 Herries Road, S.1, was admitted to membership.

The reports of the Society's activities were read and approved.

The election of Office-bearers made the following alterations to the Council:—

Professor K. W. Braid was elected President; Dr. Donald Patton and Rev. John Wanless, Vice-Presidents; Miss Margaret C. McColm, Mr. John Biggar, Mr. John Boyd, Mr. C. Eric Palmar, Members of Council; Mr. Thomas Robertson, Representative to West of Scotland Field Studies Council, succeeding Mr. J. Duncan Leslie; Mr. Daniel M. Lothian, Convener of the Entomological Section, succeeding Mr. T. M. Gordon.

The remaining office-bearers were re-elected.

8TH MARCH, 1949.

Professor Braid presided.

The following new members were admitted:—Mr. David E. Jordan, 28 Chelmsford Drive, W.2, Mr. Alastair C. Munro, B.Sc., 122 Queen's Drive, S.2.

Rev. John Wanless, F.R.M.S. delivered a lecture on "Microscopy as a Hobby." He said his interest in Microscopy was not a means to an end as in scientific research; he found it a means of escapism in the best sense of the term; by it the exquisite beauty of minute objects was revealed to the human eye. The lecturer described and illustrated, by lantern slides, the apparatus he used for photomicrography and then proceeded to show many slides of botanical, zoological and geological interest.

5TH APRIL, 1949.

Dr. Patton presided.

Mr. W. G. Hartley delivered "The Goodfellow Lecture," his subject being "Phase Contrast Microscopy" (p. 76).

9TH MAY, 1949.

Professor Braid presided.

Mr. David W. Bruce, 27 Maxwellton Road, East Kilbride, was admitted to membership.

Dr. Patton submitted a report on the excursion to Millport.

Mr. D. M. Lothian delivered a lecture on "Some Insects of Cam-buslang" (p. 86) and showed some mounted specimens.

Mr. John R. Lee read a paper on Brambles. He commented upon the great diversity of forms of the genus *Rubus* which originally consisted of four species—Cloudberry, Stone Bramble, Raspberry, Bramble (Blackberry). The Bramble, *Rubus fruticosus*, is an aggregate species with closely allied forms; for identification (from mid-July to mid-September) barren and flowering stems should be examined to discover the presence or



otherwise of immature prickles, hairs or glands; the number and arrangement of leaflets; shape, size, surface, margin, dentation of leaves; arrangement of flowers; direction of sepals; size of fruit. Mr. Lee described some particular forms which grow in known localities and exhibited herbarium specimens.

13TH JUNE, 1949.

Mr. John R. Lee presided.

The following new members were admitted:—Miss A. M. Pirie, M.A., 10 Hamilton Park Avenue, W.2; Miss Isobel Wilson, M.A., 122 University Avenue, W.2; Mr. S. E. Eglinton, Mena House, Station Road, Law Junction, Lanarkshire; Mr. John G. Miller, Bon Accord, James Street, Dalry.

Mr. Thomas Robertson submitted a list of the first arrivals of Summer Birds in the Clyde Area in 1949 (p. 91) compiled by members and friends.

There was arranged a display of indigenous flowering plants by the Botanical Section, a collection of beautiful and interesting tropical plants by Mr. Douglas, Curator of the Botanic Gardens, an exhibit of butterflies and moths from the Entomological Section, fossils of Old Red Sandstone, Carboniferous and Upper Silurian periods by the Geological Section and photomicrographs and microscope slides by Rev. John Wanless, Convener of the Microscopical Section.

11TH OCTOBER, 1949.

Mr. John R. Lee presided.

The following new members were admitted:—Miss Fiona Davidson, 17 Mansion House Road, E.2; Miss Isabel J. Dunn, M.A., Loudoun, 11 Central Avenue, Cambuslang; Miss Sheana Lang, 48 Brisbane Street, Greenock; Miss Elizabeth D. Leitch, B.Sc., 8 Princes Gardens, W.2; Mr. Iain L. Crombie, 9 Carrick Drive, E.2; Mr. William C. House, 2 Campsie Street, N.

It was announced that Rev. John Wanless was leaving Glasgow and had resigned from membership. He was thanked for the very great interest he had taken in the work of the Society, particularly in the Microscopical Section.

It was intimated that donations to the Elmhirst Memorial Fund had been received from members.

Mr. John Boyd read his report on the meetings of the British Association and a report on the outing to Kilmacolm.

Professor Braid delivered his Presidential Address on "Bracken—A Botanist's Plaything and an Agricultural Pest" (p.61).

8TH NOVEMBER, 1949.

Professor Braid presided.

Mr. John Boyd was appointed Vice-President in succession to Rev. John Wanless.

Mr. Prasher reported on the excursion to Doonfoot.

Dr. J. Inglis Cameron read a memorandum on the Clyde Valley Regional Plan, the findings and proposals of which he regarded as very satisfactory.

Mr. Lionel Holloway, F.G.S., delivered a lecture entitled "Geological Viewpoint." He gave a general discourse on the various subdivisions of the subject, indicating possible lines of study for amateurs, particularly in making local observations. The lecture was illustrated by lantern slides of natural rock formations, by an exhibition of microscopical slides and by specimens of marble and stones from Iona.

13TH DECEMBER, 1949.

Mr. John R. Lee presided.

Mr. W. Russell Hunter lectured on "The Adaptations of Fresh Water Gastropoda" (p. 84). The lecture was illustrated by lantern slides and an exhibit of shells.



## DIGEST OF THE PROCEEDINGS OF THE SOCIETY

SESSION XX—1950

*President—*

Prof. KENNETH W. BRAID, M.A., B.Sc., B.Sc.(Agr.), F.R.S.E.

*Vice-Presidents—*

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Dr. J. INGLIS CAMERON, M.B., Ch.B., F.R.F.P.S. (Glasgow).

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ALAN W. MACLAURIN.

MARGARET G. MCCOLM.

W. RUSSELL HUNTER, B.Sc., F.G.S.

MARY E. T. MCKINNA.

JOHN R. LEE, M.A.

C. ERIC PALMAR,

JAMES S. NICOL.

A.R.P.S., M.B.O.U.

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JAMES R. WOOD, C.A.

## SOCIETY MEETINGS.

10TH JANUARY, 1950.

Professor Braid, President, occupied the chair.

The following new members were admitted :—Mr. E. Ford, A.R.C.S. D.I.C., Marine Biological Station, Millport ; Mr. A. C. Crundwell, B.A., Department of Botany, Glasgow University.

Mr. James Anderson presented the exhibition of the Photographical Section. A film entitled, "British Insectivorous Plants," made by Mr. and Mrs. C. Eric Palmar, was shown. In this, the plants round-leaved sundew, *Drosera rotundifolia*, butterwort, *Pinguicula vulgaris* and bladderwort, *Utricularia*, were filmed in their natural habitats and in the laboratory where experiments filmed demonstrated the action of the tentacles of sundew, the leaves of butterwort and the submerged bladders of *Utricularia* in obtaining food from living organisms. Two other films were shown ; one of Kew Gardens, the other depicting the life of the grey squirrel. Mr. Palmar displayed a collection of excellent bird photographs.

14TH FEBRUARY, 1950.

Professor Braid presided at the Annual Business Meeting.

Dr. Isobel Case, M.A., B.Sc., Ph.D., 22 Queen's Gate, W.2 and Rev. Thomas A. Jefferies, M.Sc., F.L.S., 23 Ailsa Drive, S.2 were admitted to the Society.

The reports of the Society's activities were read and approved.

Dr. J. Inglis Cameron was elected Vice-President in succession to Mr. Lee ; Miss McKinna, Mr. Lee, Mr. McLaurin, Mr. W. Russell Hunter, Mr. James S. Nicol and Mr. Lionel Holloway were elected members of Council. Mr. James Anderson was appointed Convener of the Microscopical Section. All other office-bearers were re-elected.

14TH MARCH, 1950.

Professor Braid presided.

Mr. Alasdair Dunn, 42 Busby Road, Carmunnock and Miss Margaret H. Quigley, 128 West King Street, Helensburgh were admitted to membership.

Mr. John Boyd exhibited a specimen of *Reboulia hemisphaerica* L., a liverwort which is comparatively rare in the Clyde Area.

Miss Anne S. Robertson, M.A. delivered a lecture on "The Romans in Scotland in the Light of Recent Research." This was illustrated by lantern slides.

17TH APRIL, 1950.

Professor Braid presided.

The following new members were admitted to the Society :—Mr. Charles McIntyre, 58 Easterhill Place, E.2 ; Mr. Andrew Casey, 21 Irongrey Street, E.1 ; Mr. Basil W. Ribbons, B.Sc., A.L.S., Department of Botany, Glasgow University ; Mr. George McKerrill, M.A., c/o Cameron, 4 Brunton Street, S.4 ; Mr. Andrew Gordon and Mrs. Ann Gordon, 124 Deanston Drive, S.1 ; Mr. Neil Hinds, 450 Cumbernauld Road, E.1.

Mr. John R. Lee read a paper on the New Zealand Willow-Herb (p. 70). Thereafter he described some species of hepatics collected during Society Excursions in 1949 ; one of these, *Terrulania germana*, found near Largs by Mr. Boyd, constituted a **new record** for the county. Specimens of the willow-herb and liverworts were exhibited.

8TH MAY, 1950.

Professor Braid presided.

The following new members were admitted :—Miss Irene Madill, 300 Langside Road, S.2; Mr. A. H. Middlemast, 34 Eastwood Avenue, Giffnock; Mr. J. A. D. Paton, 11 Gogo Street, Largs.

Mr. Prasher exhibited six species of plants of the Natural Order Cruciferae—*Draba muralis*, *Erophila verna*, *Sisymbrium Thalianum*, *Cardamine hirsuta*, *Capsella Bursa-pastoris*, *Teesdalia nudicaulis*.

Dr. D. Stewart MacLagan delivered a lecture on "Major Pests of Stock and Crop in the West of Scotland" (p. 74). This was illustrated by lantern slides.

12TH JUNE, 1950.

Professor Braid presided.

The following new members were admitted to the Society—Mr. James Walker-Love, B.Sc.(Agr.), Greenbank, Clark Street, Airdrie; Mr. Wm. Cruickshank, c/o Macfarlane, 37 McCulloch Street, S.1; Mr. Alex. M. Gray, 22 Woodvale Avenue, Giffnock; Mr. John Morrison, B.Sc., 31 Thrusheraig Crescent, Paisley.

Mr. Thomas Robertson submitted a list of the first arrivals of Summer Birds in the Clyde Area in 1950 (p. 91), compiled by members and friends.

An exhibition of plants, geological specimens, butterflies and moths was displayed by the Botanical, Geological and Entomological Sections.

3RD OCTOBER, 1950.

Professor Braid presided at this meeting which was held in the Botany Department of the University.

Mr. John R. Lee was congratulated on having received the Honorary Degree of M.A. of Glasgow University, and Professor Walton on being honoured by The Royal Society of Edinburgh.

Professor Walton delivered a lecture on "The Vegetation of the European and American Arctic," illustrated by screen projections and herbarium specimens. Professor Walton showed on the screen photographs illustrating the vegetation of Spitsbergen, Greenland and Northern Canada in the Hudson Bay region. Although these three regions are on very different latitudes, they all show similarity in the constitution of their vegetation due to the fact that their climates are closely similar. Although Spitsbergen is situated so much further to the North, its climate is considerably modified by the warm Atlantic currents which sweep the West coasts of Europe, and the Greenland climate is colder as a result of the cold return currents which come down the east coast of Greenland. The Hudson Bay region, situated as it is in the centre of a continental mass, has extremely cold winters and a very short growing season. In the Hudson Bay region the flora is that of the transition region between northern coniferous forest and arctic tundra. The trees are mostly larch and spruce and in very exposed regions cannot develop an upright trunk, only the basal branches develop and the tree takes the form of a low, prostrate bush. Many plants which are found on the Scottish mountains are found in these regions including *Salix reticulata*, *Saxifraga oppositifolia* and a species of *Dryas*. On the coastal cliffs a small primrose (*Primula Laurentiana*) similar to *Primula scotica* is found. In the more sheltered woodland areas are found wild red and black currants and gooseberries and rather surprisingly *Cypripedium* (the lady's slipper orchid). Ericaceous plants including *Ledum* are found in the heathy regions. The tundra bears a thick carpet of lichen which forms the staple food of the Caribou,



the American equivalent of our reindeer. The archipelago of Spitsbergen bears a tundra vegetation with many of the plants which occur on the Scottish mountains growing at sea level. *Dryas octopetala*, *Saxifraga oppositifolia* are among the commonest of the species found there.

Fossil plants collected in these northern lands are of plants which obviously lived in a much warmer climate, in fact the climate may have been almost sub-tropical at times. This suggests that the climate in these northern countries before the Great Ice Age was very different from what it is at present. Several theories have been put forward to explain these climatic changes but so far none of these has received general acceptance.

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There was an exhibition of fungi collected at the Fungus Foray of 30th September to Callander.

7TH NOVEMBER, 1950.

Professor Braid presided.

Reports of excursions were read by Mr. Boyd, Mr. Prasher and Mr. Johnstone.

Dr. H. F. Dovaston of Auchincruive gave a talk on "The Botanist and his Garden," which he illustrated with many coloured slides of very high merit. He said that modern horticulturalists require a knowledge of a number of applied sciences in addition to botany. Crop husbandry, for example, combines various aspects of genetics, pathology, entomology and physiology with purely practical knowledge. A good deal of recent research has been concentrated on problems which are on the borderline between applied science and crop production. The lecturer spoke of the hybridisation of plants with the object of improving the colour and size of flower and their general hardiness, and also of such utilitarian features as disease resistance of tomatoes, resistance to frost of potatoes and the physiology and treatment of bulbs for special forcing methods. The lecturer described the improvements made in the *Dahlia* by hybridisation. Two collections were sent from Mexico at the end of the 18th century and by crossing and selection 1,500 varieties were made by 1831. The great range of modern *Astilbe* hybrids have all come from four species (*astilboides*, *Davidii*, *japonica* and *Thunbergii*). Modern lupins have been bred from a small number of species including *Lupinus polyphyllus*, *arboreus* and *lepidus*. By use of these species perennial habit and flower quality have been combined in one plant. Hardiness and flower quality have also been combined in the thousands of *Rhododendron* varieties produced during the last hundred years. This was only made possible by the great wealth and variety of species introduced by successive collectors from the Himalayas and west China.

19TH DECEMBER, 1950.

Professor Braid presided.

Mr. William W. Fletcher, B.Sc., 28 Robertson Street, Airdrie, was admitted to membership. Professor Braid read a report on the excursion to Flanders Moss.

The Rev. Thomas A. Jefferies, M.Sc., F.L.S. delivered a lecture on "The Story of a Moorland Grass." (p.68).





## INDEX

- ABBE, Prof. ERNST, 76-77  
 Aberfoyle, 94  
 Acronycta tridens, 87  
 Æsculus flava, 44  
     octandra, 44  
 Aeshna juncea, 90  
 Æthusa Cynapium, 21, 98  
 Aglais urticae, 87, 98  
 Agrotis saucia, 24  
     suffusa, 24  
 Allium carinatum, 48, 94  
     Scorodoprasum, 96  
 Amblystegium felicinum, var. trichodes, 55  
 Ambrosia artemisifolia, 94  
 Anagallis arvensis, 98  
     tenella, 98  
 Ancylostomum, 85  
 Ancylos, 85  
 ANDERSON, JAMES, 102, 105  
 Andreaea crassinerva, 43, 55  
 Aretia caja, 89  
 Arctic, The Vegetation of the European and American Arctic, Walton, 106  
 Ardgool, Phanerogams and Ferns of South Ardgool, Nisbet, 34  
 Argynnis aglaia, 24  
 Arum maculatum, 51, 95  
 Asplenium Breynii (germanicum), 44  
 Auchinreoch Glen, 27  
 Auchincruive, 44  
  
 Badger, 1, 30  
 BALFOUR-BROWNE, Prof. W. A. F. 8  
 Ballantrae, 95  
 Ballochraggan, Bracken Experimental Station, 66, 69, 94  
 Balmaha, 99  
 Barassie, 99  
 Bardowie, 73  
 Barytes, 17  
 Basommatophora, 84-85  
 Beith, 16  
 Birds, First Arrival of Summer Birds in Clyde Area, Robertson, 3-6, 29, 38-40, 56, 91-92, 103, 106  
 Bishopston, 42-43, 98  
 Biston betularia, var. double dayaria, 87  
 Bithynia, 84  
 Blackwood, 51, 98  
 Blackcap, 99  
 Bladder-nut, 43  
 Blantyre Priory, 18  
 BOYD, JOHN, 1, 2, 22, 30, 41, 43, 57, 58, 105  
 Bracken, A Botanist's Plaything and an Agricultural Pest, Braid, 61-67, 103  
 BRAID, Prof. K. W., 43, 44-45, 61-67, 69, 102, 103, 105, 106, 107  
 Braevall, 13  
 Braidwood, 19, 95  
 British Association Meetings, 7-10, 41  
 Brown Trout Research Laboratories, 97  
 Bunting, Snow, 58  
 Buzzards, 99  
  
 Calder Glen, Lochwinnoch, 45  
 Cambuslang, Some Insects of, Lothian, 86-90, 102  
 CAMERON, J. INGLIS, 27, 58, 67, 102, 103  
 Campanula rapunculoides, 47, 98  
 Campylostelium saxicola, 49  
 CANNON, W., 24-25, 27, 99, 100  
 Carex disticha, 20  
     ericetorum, 44  
     limosa, 50, 93  
     teretiuscula, 20, 50  
     vulpina, 44, 96  
 Carum Carui, 98  
 Catabrosa aquatica, 98  
 Ceterach officinarum, 44  
 Cheiranthus Cheiri, 95  
 Chelidonium majus, 95  
 Chrysopa carnea, 90  
 Cleaves Cove, 52  
 Cleghorn Woods, 15  
 Coenagrion puellum, 90  
 Coenonympha pamphilus, 88  
 Coilantogle, 14  
 Colias croceus, 22, 23, 24  
 Colorado Beetle, 22  
 Convolvulus arvensis, 21, 94  
 Cordyceps, Some Observations on, Meikle, 30  
 Crab, Hermit, 29

CRAIG, JEAN C. D., 27, 53  
 Craigmore, 13  
 Cuckoo, Black-billed, 100  
 Cumbræ, 22, 98

Dalry, 52, 99  
 Daphne laureola, 18  
 Dicranella heteromalla, 96  
 Diver, Great Northern, 99  
 Doonfoot, 94  
 DOUGLAS, JOHN, 57, 103  
 DOVASTON, H. F., 44, 107  
 Dove, Turtle, 6, 100  
 Draba muralis, 49, 106  
     rupestris, 44  
 Dumbarton, 97  
 Dunure, 41, 42

Eagle, Golden, 54-55  
 ELMHIRST, RICHARD, 28, 45  
 Endrick, River, 53  
 Ephydatia, 53  
 Epilobium nerteroides, 71  
     nummularifolium, 52, 70-73  
     pedunculare, 70-73  
 Equisetum maximum, 95  
 Erebia aethiops, 24  
     epiphron, 24  
 Erinus alpinus, 98  
 Erythræa Centaurium, 98  
 Euonymus europæus, 44  
 EWING, PETER, 72  
 EWING, MRS., 72

Fagus sylvatica, var. heterophylla, 44  
 Fairlie, 96, 98  
 Fannyside Moor, 99  
 Field Studies Council, West of Scotland,  
     10-12, 19, 21  
 Flanders Moss, 95-96, 107  
 Flycatcher, Pied, 6, 100  
 Fragaria vesca, 58, 67, 102  
 Fraxinus ornus, 44  
 Fucus serratus, var. latifolius, 55  
 Fumaria Boræi, 99

Galium uliginosum, 20, 52  
 Gastropoda, The Adaptations of Fresh-  
     water, Hunter, 84-85, 103  
 Gentiana campestris, 99  
 Geometra papulionaria, 23  
 Geranium columbinum, 95  
     pusillum, 94  
     sanguineum, 95

Ginkgo, 44  
 Goldeneye, 99  
 Goodfellow Lecture, 76  
 GORDON, THOMAS H. M., 21-24, 54  
 Grebe, Great Crested, 1  
 GREENLEES, J., 100  
 GRIERSON, ROBERT, 49, 72, 94  
 Gull, Ivory, 99

HARTLEY, W. G., 76-83, 102  
 Hecatera serena, 87  
 Helianthemum Chamaecistus, 15, 95  
 Helminthosporium, 44  
 Heracleum villosum, 94  
 Heterocladium heteropterum, 55  
 Hiatella, The Occurrence of, in the  
     Clyde Sea Area, Hunter, 37  
 Hippophae rhamnoides, 47  
 HOLLOWAY, L., 24, 103  
 HOPKINS, NICOL, 1, 23  
 Hordeum marinum, 99  
 Horse-tails, Living and Extinct, Walton  
     29  
 HUNTER, W. RUSSELL, 37, 84-85,  
     103  
 Hunterston, 96  
 Hypena proboscidales, 90

Impatiens glandulifera, 99  
 Inocybe geophylla, 46  
 Inverkip, 1, 30, 49  
 Ischnura elegans, 90

JEFFERIES, Rev. THOMAS A.  
 68-69, 107  
 Juncus glaucus, 98  
     maritimus, 98  
     trifidus, 44  
 Juniper, 14, 93

Kilbride, West, 2, 30, 46  
 Killin, 14  
 Killoch Glen, 73  
 Kilmacoll, 93, 98  
 KING, L. A. L., 57, 58-60  
 Kippen, 14  
 KIRKWOOD, JAMES, 25, 99, 100

Laburnum Adami, 44  
 Lactuca muralis, 20, 96

*Lamium Galeobdolon*, 20  
     amplexicaule, 96  
*Lampyrus noctiluca*, 98  
 Lanark, 98  
 Langbank, 42-43, 55, 98  
 Lanrick Mead, 14  
 Largs, 1, 2, 30, 48, 49, 98  
 LEE, JOHN R., 7-10, 27, 28, 30, 53, 54,  
     56, 57, 70, 70-73, 102, 103, 105, 106  
*Leptinotarsa decemlineata*, 22  
 LESLIE, J. DUNCAN, 22, 24, 28  
 Libo, Loch, 51, 71, 73  
*Ligusticum scoticum*, 47  
*Limnaea truncatula*, 85  
     palustris, 85  
     peregra, 85  
*Lithomoia solidaginis*, 23  
 LLOYD, BLODWEN, 27, 28  
 Lochaber, 24  
*Lophopteryx camelina*, 24  
 LOTHIAN, D. M., 22, 23, 24, 86-90,  
     98, 102  
*Lozogramma petraria*, 23  
*Luzula spicata*, 44  
*Lychnis vespertina*, 19  
*Lycaena phlaeas*, 87  
*Lycopus europæus*, 96, 98  
*Lysimachia thyrisiflora*, 20, 98  
     vulgaris, 94, 96, 99

McCRINDLE, JOHN, 41, 58  
 MacLAGAN, D. STEWART, 74-75,  
     106  
 MacLAURIN, M., 22, 23  
 McLEAN, GEORGE, 28  
*Macroglossa stellatarum*, 23, 24  
*Malva rotundifolia*, 94  
*Maniola jurtina*, 88  
 Marine Biological Station, Millport, 45,  
     93, 95  
 Mearns Lochs, 50  
 MEIKLE, AGNES, 30  
*Melilotus alba*, 98  
*Meum athamanticum*, 93, 98, 99  
 Microscopy, Phase Contrast, Hartley,  
     76-83  
*Molinia caerulea*, The Story of a Moor-  
     land Grass, Jefferies, 68-69  
 Montagu's Harrier, 100  
 Muirshiels, Lochwinnoch, 17  
*Myosotis alpestris*, 44  
  
 Neillia opulifolia, 99  
*Neottia Nidus-avis*, 45, 98  
 Neritina, 84

## NEW MEMBERS—

Baird, Kathleen J., 102  
 Brian, Michael B., 29  
 Brown, Alex., 54  
 Brownlie, Andrew D., 29  
 Brown, Andrew Hamilton, 56  
 Bruce, David W., 102  
 Case, Isobel, 105  
 Casey, Andrew, 105  
 Cooper, A., 28  
 Crombie, Iain L., 103  
 Cruickshank, William, 106  
 Crundwell, A. C., 105  
 Davidson, Fiona, 103  
 Dunn, Isabel J., 103  
 Dunn, Alasdair, 105  
 Eglinton, S. E., 103  
 Ford, E., 105  
 Fletcher, William W., 107  
 Gordon, Andrew, 105  
 Gordon, Mrs. Ann, 105  
 Gray, Alex. M., 106  
 Hamilton, Thomas, 28  
 Hill, Edward G., 29  
 Hinds, Neil, 105  
 House, William C., 103  
 Hughes, John M., 54  
 Hunter, W. Russell, 57  
 Jefferies, Rev. Thomas A., 105  
 Johnstone, Lily, 29  
 Jordan, David E., 102  
 Lang, Sheena, 103  
 Leitch, Elizabeth D., 103  
 Lindsay, Thomas B., 54  
 McGown, Violet M., 28  
 McIntyre, Charles, 105  
 McKerrill, George, 105  
 McLintock, Mary A., 56  
 Madill, Irene, 106  
 Maxwell, Mary M., 30  
 Medine, Hugh, 28  
 Middlemast, A. H., 106  
 Morrison, John, 106  
 Miller, John G., 103  
 Munro, Alastair C., 102  
 Munro, Robert K., 29  
 Palmar, C. Eric, 56  
 Paterson, George D., 102  
 Paton, J. A. D., 106  
 Pirie, A. M., 103  
 Quigley, Margaret H., 105  
 Reynolds, Cyril E., 58  
 Ribbons, Basil W., 105  
 Sangster, Douglas G. R., 54  
 Smith, Dugald, 29  
 Stark, Elizabeth, 29  
 Stark, Mary R. N., 56  
 Syme, Mrs. Betty, 27  
 Walker-Love, James, 106



Wallace, Alison T. M., 28  
 Wanless, Rev. John B., 30  
 Wilson, Isobel, 103

*Nymphalis io*, 23, 87, 98

#### OBITUARIES—

Brown, Hugh Alexander, 31  
 Cochran, Kenneth H., 60  
 Elmhirst, Richard, 58  
 Lunan, George, 35  
 McIntyre, William, 32  
 Nisbet, Thomas, 33

*Ononis repens*, 98  
*Ophioglossum lusitanicum*, 44  
*Ornithopus perpusillus*, 98, 99  
*Ortholitha limitata*, 90

PALMAR, C. ERIC, 54-55, 100, 102, 105

PALMAR, MRS., 105

*Paludicella*, 53

*Paludestrina jenkinsii*, 84

*Paris quadrifolia*, 19

PATTON, DONALD, 22, 35-36, 55, 57, 60, 73, 100, 102

*Paulownia imperialis*, 44

Pests, Major Pests of Stock and Crop  
 in the West of Scotland, MacLagan,  
 74-75, 106

*Petrobius maritimus*, 42

Petrology, 24

*Petromyzon marinus*, 53  
*planeri*, 53

PETTIGREW, WILLIAM, 27, 53

*Peziza cerea*, 56

Phase Contrast Microscopy, Hartley,  
 76-83, 102

*Pholas*, 37

*Physa*, 85

*Pieris brassicae*, 89  
*rapae*, 89  
*napi*, 89

*Pinguicula lusitanica*, 98

*Pitlochry*, 97

*Planorbis*, 85

*Plusia bractea*, 90  
*chrysis*, 90  
*gamma*, 90  
*moneta*, 90

*Polia chi*, 87

*Polyommatus icarus*, 24, 87

Portincross, 46-47

Possil Marsh, 1, 20

*Potentilla norvegica*, 98  
*reptans*, 98  
*rupestris*, 44

*Poterium canadense*, 94

PRASHER, RICHARD, 18-21, 33, 47,  
 48-52, 98, 106

*Primula farinosa*, 44  
*scotica*, 44, 106  
*stricta*, 44

*Prosobranchia*, 84

*Puccinia adoxae*, 43

*Pulmonata*, 85

*Pyrola minor*, 19, 98

*Pyrrhosoma nymphula*, 90

RAMSBOTTOM, J., 7, 8, 9, 56

*Ranunculus auricomus*, 50, 98

*hederaceus*, 98

*sceleratus*, 96

*trichophyllus*, 95

*Raphanus maritimus*, 47

*Reboulia hemisphaerica*, 105

Redstart, 99

Renfrew Heights, Boyd, 58

Renfrewshire, 50

RENNIE, WILLIAM, 1, 11, 25, 56, 72

REYNOLDS, CYRIL E., 58

*Rhamnus Frangula*, 99

RHEINBERG, JULIUS, 77, 80

ROBERTSON, ANNE, 11, 105

ROBERTSON, THOMAS, 3-6, 29, 38,  
 56, 91-92, 99, 103, 106

Roman Wall, Duntocher, 11

Rossdhu, 53, 93

Rotten Calder, 48, 98

Rowardennan, 98

*Rubus fruticosus* (agg.), 102

*Rumex longifolius*, 99

RUSSELL, WILLIAM, 22, 29

*Sagina nodosa*, 99

*subulata*, 98

*Salix repens*, 20

Saltscoats, 99

Sandstone, Old Red, 47

*Saxicava rugosa*, 37

*Saxifraga nivalis*, 44

*Scilla verna*, 95

*Senebiera Coronopus*, 47  
*didyma*, 98

*Senecio sylvaticus*, 96, 98

Shielhill Glen, Inverkip, 49

Silver Strand, 14

*Sisymbrium Alliaria*, 43, 50

Skelmorlie, 49, 73

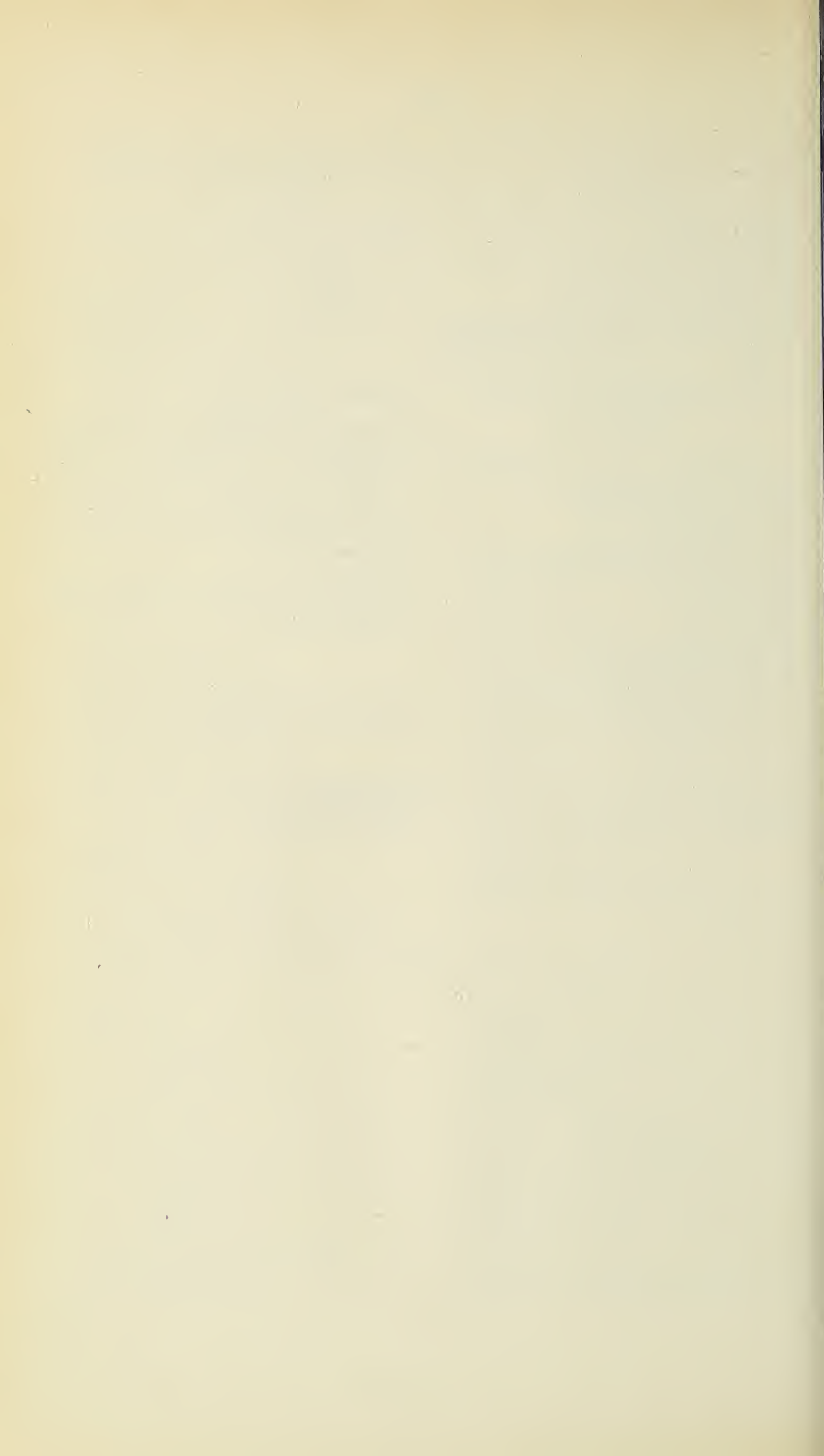
SLACK, H. D., 53

Smatterings, William Rennie, 25

*Solanum Dulcamara*, 98, 99

*Sphinx convolvuli*, 23  
*Spilosoma lubricepeda*, 89  
     *menthastri*, 89  
 Spindle Tree, 44  
 Spurge Laurel, 18  
*Staphylea pinnata*, 43  
 Stevenston, 99  
 STOLLERY, ERNEST, 55  
 Stromatolites, 56  
 Summer Birds, First Arrivals, Robert-  
     son, 3-6, 29, 38-40, 56, 91-92, 103,  
     106  
*Symphytum aspernum*, 15, 45, 94  
     *officinale*, 94  
     *peregrinum*, 94  
  
 TANNAHILL, ROBERT, 16  
*Teesdalia nudicaulis*, 106  
 Tern, Roseate, 6  
*Terrulania germana*, 105  
*Tetraphis Browniana*, 48, 55  
*Theodoxus*, 84  
*Tillietudlem*, 95  
 Tollcross, 98  
 Torrance Glen, 48, 55  
*Tortula ruraliformis*, 96  
*Trientalis europæa*, 19, 50, 99  
*Trifolium arvense*, 94  
     *striatum*, 95  
 Trossachs, 12-15  
  
*Uromyces ficariae*, 43  
*Utricularia intermedia*, 94

*Vanessa atalanta*, 23  
     *cardui*, 23  
     *urticae*, 22  
*Viburnum Lantana*, 46  
*Vicia sylvatica*, 95  
 Vine, Hampton Court, 14  
     Killin, 14  
     Kippen, 14-15  
*Viviparus*, 84  
  
 Wagtail, White, 99  
     Yellow, 99  
 WALTON, Prof. JOHN, 11, 27, 30, 53,  
     54, 55, 56, 58, 72, 102, 106  
 WANLESS, Rev. JOHN B., 53, 102,  
     103  
 Warbler, Garden, 99  
 Waxwings, 2, 30  
 Whangie, 55  
 Whooper Swan, 99  
 Willow-herb, The New Zealand, Lee,  
     70-73, 105  
*Woodsia alpina*, 44  
  
*Xylophasia monoglypha*, 87  
  
 ZERNIKE, F., 77, 81  
*Zostera nana*, 96  
*Zygaena filipendulae*, 47









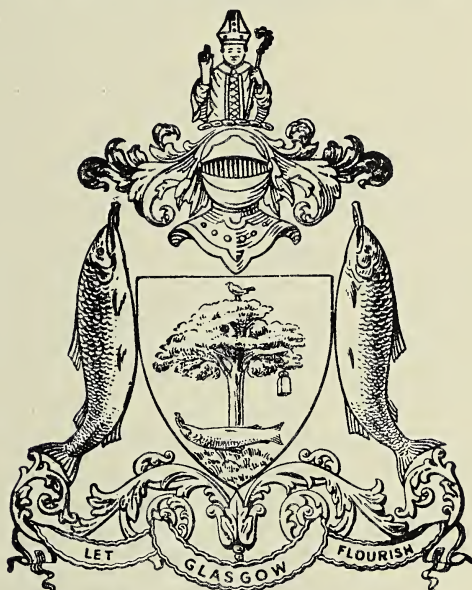
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## CONTENTS

|  | PAGE |
|--|------|
| CENTENARY CELEBRATIONS—SPECIAL ARTICLES ...  | 1    |
| PAPERS—  |      |
| Ancient Volcanoes of Western Scotland  |      |
| B. C. King ... ..  | 36   |
| Territory in Ants  |      |
| M. V. Brian ... ..   | 37   |
| Isle of May Bird Observatory   |      |
| M. F. M. Meiklejohn ... ..   | 39   |
| The Isles of Scilly  |      |
| B. W. Ribbons ... ..   | 41   |
| An Introduction to Spiders   |      |
| James Graham ... ..  | 42   |
| The Association of Fungi with Bryophytes   |      |
| S. Williams ... ..   | 45   |
| Additions to the Flora of the Clyde Area   |      |
| John R. Lee ... ..   | 65   |
| New Plant records for the West of Scotland   |      |
| K. N. G. MacLeay ... ..  | 82   |
| Further new and newly-confirmed records of the distribution<br>of fresh-water snails in the West of Scotland   |      |
| W. Russell Hunter ... ..   | 84   |
| A preliminary list of stoneflies (Plecoptera) from the Glasgow<br>Area   |      |
| Frank L. Sinclair ... ..   | 89   |
| A note on the amphibious snail <i>Succinea pfeifferi</i> , Rossmässler,<br>in a previously undescribed habitat |      |
| W. Russell Hunter ... ..   | 91   |
| Note on the Great Spotted Woodpecker <i>Dendrocopus<br/>major</i> L.   |      |
| K. W. Braid ... ..   | 92   |
| The British Herbarium of the Botanical Department of<br>Glasgow University                                     |      |
| Donald Patton ... ..   | 105  |

|   |     |
|---|-----|
| Dr. James Cargill—an early Aberdeen Botanist  |     |
| K. W. Braid     ...     ...     ...     ...     ...   | 127 |
| On the situation and geological structure of the Garvelloch Islands                                       |     |
| W. Russell Hunter and David A. Muir     ...     ...   | 129 |
| A Note on Insects from the Garvelloch Islands   |     |
| David A. Muir     ...     ...     ...     ...     ...   | 140 |
| The Birds of the Garvelloch Islands ...     ...   |     |
| Margaret H. Dunn, W. Russell Hunter and Alasdair Dunn   | 142 |
| On Animal Ecology in the Garvelloch Islands   |     |
| W. Russell Hunter     ...     ...     ...     ...     ...   | 147 |
| The Plants of Possil Marsh  |     |
| Donald Patton and William Rennie     ...     ...     ...  | 160 |
| Endemicism in the Snails of Jamaica   |     |
| W. Russell Hunter     ...     ...     ...     ...     ...   | 173 |
| Ben Lawers—past and present   |     |
| John R. Lee and Donald Patton     ...     ...     ...   | 184 |
| Observations on Exotic Fishes   |     |
| Wm. John Cannon     ...     ...     ...     ...     ...   | 189 |
| Climatological and Salinity Data for Millport, Scotland   |     |
| H. Barnes     ...     ...     ...     ...     ...     ...   | 193 |
| Some Observations on Beetles of the family Clambidae  |     |
| R. A. Crowson and E. A. Crowson     ...     ...     ...   | 205 |
| New and newly-confirmed distribution records of non-marine Molluscs in the West of Scotland (IIIrd paper) |     |
| W. Russell Hunter     ...     ...     ...     ...     ...   | 207 |
| A new sub-species of Charr from Loch Eck  |     |
| G. F. Friend     ...     ...     ...     ...     ...  | 219 |
| Additions and corrections to the moss flora of Dunbartonshire   |     |
| A. C. Crundwell     ...     ...     ...     ...     ...   | 221 |
| Notes on the food and parasites of Pike ( <i>Esox lucius</i> ) in Loch Lomond                             |     |
| W. O. Copland     ...     ...     ...     ...     ...   | 230 |
| Records of the arrival of summer birds—Summary of Results   |     |
| Thomas Robertson     ...     ...     ...     ...     ...  | 236 |
| A note on <i>Plumatella</i> and <i>Ancylus</i> in a mountain lochan                                       |     |
| W. Russell Hunter and M. Russell Hunter     ...     ...   | 241 |
| Notes on the Hydromedusae of the Clyde sea area with new distribution records                             |     |
| M. Vannucci     ...     ...     ...     ...     ...   | 243 |
| A key to the British species of the genus <i>Cyclops</i> O. F. Müller                                     |     |
| F. E. Slack     ...     ...     ...     ...     ...   | 250 |



|  |                             |
|--|-----------------------------|
| Additions and corrections to the Liverwort Flora of Dunbartonshire |                             |
| A. C. Crundwell ... ..   | 264                         |
| The small mammals of a Dunbartonshire oakwood                      |                             |
| M. J. Delany ... ..  | 272                         |
| A lichen new to Scotland   |                             |
| A. C. Crundwell ... ..   | 279                         |
| Lumbricidae at Boreray, St. Kilda                                  |                             |
| J. Morton Boyd ... ..  | 280                         |
| Some records of Clydesdale Fungi                                   |                             |
| R. H. Johnstone ... ..   | 49, 282                     |
| Additions to the Flora of Possil Marsh                             |                             |
| B. W. Ribbons ... ..   | 283                         |
| Lists of first arrivals of summer birds in Clyde Area              |                             |
| Compiled by Thomas Robertson ...                                   | 46, 93, 151, 212, 257, 284  |
| LISTS OF OFFICE-BEARERS ...  | 56, 102, 155, 214, 259, 286 |
| NOTES FROM EXCURSION, SECTION AND OTHER REPORTS                    |                             |
|  | 50, 95, 153, 215, 260, 287  |
| DIGEST OF THE PROCEEDINGS OF THE SOCIETY                           |                             |
|  | 56, 103, 156, 216, 261, 289 |
| LIST OF MEMBERS ... ..   | 291                         |

# The Glasgow ✧ Naturalist

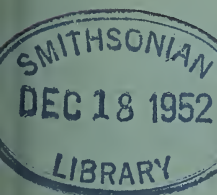
*The JOURNAL of the*  
**GLASGOW AND ANDERSONIAN NATURAL  
HISTORY AND MICROSCOPICAL SOCIETY**

including the  
*Transactions and Proceedings*  
of the Society

## Centenary Number

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Part  
1

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Edited by MABEL G. SCOTT, M.A., B.Sc.

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# CONTENTS

|  |       |
|--|-------|
| FOREWORD   | PAGES |
| K. W. Braid, O.B.E., M.A., B.Sc., B.Sc.(Agric.), F.R.S.E.    | 1     |
| HISTORY OF THE SOCIETY                                       |       |
| John R. Lee, M.A. ....                                       | 4     |
| GLASGOW'S NATURAL HISTORY SOCIETIES                          |       |
| Donald Patton, M.A., B.Sc., Ph.D., F.R.S.E. ....             | 8     |
| CENTENARY CELEBRATIONS—                                      |       |
| Thanksgiving Service   |       |
| Rev. Professor Ian Henderson, B.D. ....                      | 11    |
| Public Lecture—Marine Biology in the West of Scotland        |       |
| C. M. Yonge, Ph.D., D.Sc., F.R.S. ....                       | 13    |
| Special Excursions ....                                      | 15    |
| The Dinner (Editor) ....                                     | 19    |
| The Exhibition (W. J. Cannon) ....                           | 23    |
| PAPERS—  |       |
| Ancient Volcanoes of Western Scotland                        |       |
| B. C. King, D.Sc., F.R.S.E., F.G.S. ....                     | 36    |
| Territory in Ants  |       |
| M. V. Brian, M.A., F.R.E.S. ....                             | 37    |
| Isle of May Bird Observatory                                 |       |
| M. F. M. Meiklejohn, M.A. ....                               | 39    |
| The Isles of Scilly ....                                     |       |
| B. W. Ribbons, B.Sc., A.L.S. ....                            | 41    |
| An Introduction to Spiders ....                              |       |
| James Graham ....  | 42    |
| The Association of Fungi with Bryophytes                     |       |
| S. Williams, Ph.D., D.Sc., F.R.S.E. ....                     | 45    |
| List of First Arrivals of Summer Birds in Clyde Area in 1951 |       |
| Compiled by Thomas Robertson ....                            | 46    |
| NEW RECORDS ....   | 48    |
| SOCIETY REPORTS ....   | 50    |
| EXCURSION REPORTS ....                                       | 51    |
| SECTIONAL REPORTS ....                                       | 53    |
| DIGEST OF THE PROCEEDINGS OF THE SOCIETY ....                | 56    |
| OBITUARIES—  |       |
| Agnes Meikle ....  | 60    |
| John Duncan Leslie ....                                      | 60    |
| Mrs. Ewing ....  | 62    |
| Archibald Shanks ....  | 63    |
| James Robertson Jack ....                                    | 64    |

## ILLUSTRATIONS

|   |    |
|---|----|
| Facsimile of First Minute of the Society .... | 3  |
| List of Presidents ....                       | 7  |
| In the Field ....                             | 31 |
| Beaks, Feet and Feathers (Case 1) ....        | 31 |
| Plan of Exhibition ....                       | 32 |
| General View of Exhibition ....               | 34 |

## Foreword

K. W. BRAID, O.B.E., M.A., B.Sc., B.Sc.(Agric.), F.R.S.E.

*As the Society was approaching its centenary it was felt by members that some form of celebration and display was desirable—some tangible reminder, to all those who are interested in any of the many sub-divisions of Natural History that there is a Society which has for the past hundred years acted as the centre for the collection of all the information which naturalists might desire in connection with the West of Scotland.*

*One of the values of such an anniversary is that it links us up with the generation of our grandparents and great-grandparents.*

*In the early years of the Society the theories of evolution were revolutionising all previous concepts. Later the part played by bacteria in commerce and disease led to more and more specialists. As studies became more centred in laboratories and out of touch with field work a materialistic attitude developed. Some fifty years ago discoveries in genetics, coupled with studies of the cell, initiated a new science again with great practical applications, but, like some of the still later developments, of too technical a nature to appeal, at that stage, to the layman. During the first war and its aftermath, the lure of the cinema, mechanical transport and radio attracted the popular imagination for several years, but the healthy activities of the hikers, mountaineers and other outdoor enthusiasts gradually regained adherents for a love of the countryside, which has brought a fresh desire to know more about Nature in all her aspects.*

*It is just to stimulate these interests and enthusiasms among young recruits that such a body as the Glasgow and Andersonian Natural History and Microscopical Society exists. Few naturalists who work on their own appreciate the advantages obtainable from occasional excursions and meetings when their views and discoveries can be discussed with others in allied branches of their subject. And many beginners do not realise the great advantages of the expert advice and encouragement which they may receive at meetings and on excursions.*

*This Centenary Number puts on record our celebrations of 1951. Without the loyal and concentrated efforts of members the success which crowned our actions would have been lacking. Many months beforehand, committees discussed ideas and plans and eventually prepared a scheme of workable dimensions. It is impossible to record the enthusiastic assistance of all, for nearly every member in some way contributed to the success. But I should*



like to pay special tribute to certain members. To the Council, conveners of sections and others appointed to our Committee I wish to express great indebtedness. The co-ordinating arrangements which lay behind the schemes were less obvious, but even more vital; and for these especial thanks are due to our enthusiastic and efficient honorary secretary, Miss Jean C. D. Craig, B.Sc., our equally helpful treasurer, Mr. Robert H. Johnstone, M.A., and our meticulous minute secretary, Miss Phyllis Woodland; they were the hub round which our activities revolved. Mr. William J. Cannon, F.G.S., was responsible for the lay-out of the exhibition—a colossal task. During all the hours that the Exhibition was open, members were in attendance and to them and to Mr. John Boyd, who arranged the stewarding and who often filled a “blank” himself, we are very grateful. The effective publicity work by Mr. Basil W. Ribbons was most helpful. Lastly the speedy production of our Centenary Number has been made possible by the enterprise of our honorary editor, Miss Mabel G. Scott, M.A., B.Sc., who has succeeded in bringing our publications up-to-date; to her we offer our sincere thanks and good wishes.

We offer our most hearty thanks to Lord Provost, Sir Victor Warren, and the Corporation Committee for the Glasgow Art Gallery and Museums, for the privilege of holding the exhibition in the Museum at Kelvingrove; and to Dr. S. M. K. Henderson, Director of the Museum, and his staff for all their assistance in setting it up.

Since the union of the Societies in 1931, we have continued to meet in the Royal Technical College, and our Library is housed in the Mitchell Library; we gratefully acknowledge our indebtedness to both of these Institutions for their hospitality over many years.

We have gained new strength by the addition of many new members: may I extend to them a hearty welcome and renew the invitation to participate in all our activities.

I feel convinced that the past year of mutual endeavour to make our Society work as a unit has greatly helped to rejuvenate us: we now go forward confident in the future.



Facsimile of First Minute of the Society

Whistle Temperance Hotel  
Glasgow - 2 July 1857

At a meeting of Gentlemen interested in the pursuit of Natural Science, present, Messrs Wm Gourlie, D. Lorrain, Tho. Gray, John Gray, Robert Gray, Archd Gray, Jas. P. Fraser, Wm. Ferguson, and Tho. Ferguson; Mr. James P. Fraser was called to the chair, and Mr. W. Ferguson appointed interim secretary; after which it was unanimously agreed to form a society under the name of "The Natural History Society of Glasgow," the objects of which shall be, to encourage the pursuit of Natural History in all its branches, and to foster a love of the sciences, by meetings for the exhibition of specimens both native and foreign, the reading of Communications, and excursions for mutual improvement. —

Mr. William Gourlie was unanimously elected president.

Mr. James P. Fraser was unanimously elected secretary and Treasurer.

The meetings of the society to be held in No 12 South Hanover Street, on the evening of the first Tuesday of each month, at seven o'clock. Three to form a quorum.

Members to be elected by ballot. They must be proposed at one meeting, and balloted for at the one following. One black ball to exclude.

Members to have the privilege of introducing friends.

The annual contribution to cover expenses to be Two shilling and sixpence in the meantime.

Notices of motions affecting the Constitution of the society to be given at the meeting previous to discussion, — three fourths of the votes present, required to carry such motions.

James P. Fraser chairman

# The Glasgow Naturalist

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AND MICROSCOPICAL SOCIETY

## CENTENARY NUMBER

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Published 1952

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### THE HISTORY OF THE SOCIETY

By John R. Lee, M.A., *Past President*

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The Society took its origin from a gathering of "gentlemen interested in the pursuit of Natural Science" who met together in the *Thistle* Temperance Hotel, Glasgow, on 2nd July, 1851. They were nine in number; and it is recorded that they "unanimously agreed" to form a society with the title of *The Natural History Society of Glasgow*. One week later a second meeting of the same persons, with two additions to their number, took place in a room at No. 12, South Hanover Street, which became the first regular meeting place of the Society. The eleven gentlemen present at this meeting were entered on the Roll as "original members."

From this seemingly meagre beginning the Society soon grew in number, and it quickly became evident that interest in its aim and object was widespread. That object, as defined in the constitution, was "to encourage the pursuit of Natural History in all its branches, and to foster a love of the science, by meetings for the exhibition of specimens both native and foreign, the reading of communications, and excursions for mutual improvement." Very quickly the list of ordinary and corresponding members came to include many names which have since become well-known to their own and subsequent



generations as those of distinguished naturalists outstanding in the various departments of nature study which claimed their several attention.

It is interesting to record that the first "ordinary" member whose name was added to the Roll (after the "originals") was Roger Hennedy, afterwards well-known for his botanical work, who soon became active as a worker in different departments of the Society's activities. A month after his admission to membership he, in accordance with the rules, gave notice that he would propose the name of his friend Hugh Macdonald—the well-known "rambler" and poet, who was in due course admitted at the next meeting.

Among the many names which follow in quick succession on the early lists of members appear such celebrities as David Robertson (joint founder with Sir John Murray of the Millport Marine Station), Professor Walker-Arnott, and the elder Dr. Landsborough; while later there appear the names of Thomas Chapman (lepidopterist), Robert Gray, the celebrated ornithologist, Professor F. O. Bower, J. A. Harvie-Brown, Peter Cameron, Thomas King, Dr. Kidston, the younger Landsborough, Professor I. Bayley Balfour, Peter Ewing, Dr. Stirton, R. D. Wilkie, John Cairns, and John Paterson.

The records of the Society bear evidence of the active enthusiasm of its early members, whose studies ranged over a wide field—zoological, botanical and geological—and it was not long until its activities became recognised as of first class importance in the scientific world. Though from the beginning much of its best work was done by amateurs, it nevertheless received recognition by men of professional standing; and from early days the University seems to have realised the importance of the work being done. This happy association between those actively engaged in teaching and research in the natural sciences and the "field naturalists" to whom the outer world made irresistible appeal has all along continued a characteristic of the Society, and is indeed one of its most valuable and cherished features.

The Society continued to be known by its original name for nearly eighty years. Its Jubilee was celebrated in 1901, at a special meeting under the presidency of Alexander Somerville, the distinguished botanist, and attended by many celebrated men from various parts of the country, who bore testimony to the value of its work. In the meantime, there had grown up the active association of younger men who had formed the *Andersonian Naturalists' Society*, founded in 1885 by a number



of students attending the popular classes of the old "Andersonian College"; and also the *Microscopical Society of Glasgow* (1886); both of which societies had been doing good work on similar lines. In January, 1931, by mutual agreement, these bodies were amalgamated with the older Society; and the combination adopted the name—perhaps a somewhat cumbersome one—by which it is at present known.

The work of the Society, although not entirely confined to the Natural History of our own country, has of course been mainly occupied with the fauna, flora and geology of the West of Scotland. In this connection it has contributed very largely to our knowledge of a district rich in material for the studies it has undertaken. In particular it may be mentioned that the issue of the valuable lists of the fauna and flora published in connection with the Glasgow meetings of the British Association in 1901, was undertaken by the Society. These lists are still regarded as an authoritative account of the Natural History of the district; and, with the subsequent additional information published from time to time in the Society's Transactions, are accepted as a proper basis for the observations of students in the field.

A more recent extension of the Society's work was the formation in 1945 of what was at first known as "The West of Scotland Field Studies Council," after some fifteen months of preliminary negotiations which were sponsored throughout by this Society. This was an attempt to extend the special interests of its members by enlisting the co-operation of students in all departments of out-door observation and research—natural history, archaeology, etc.—and to popularise such studies, particularly among the young. It is gratifying to know that this effort has been eminently successful. The Council soon changed its name to that of the "Scottish Field Studies Council"—its sphere of operation having quickly spread; and it now functions as the Council of the more recently formed "Scottish Field Studies Association," whose activities have extended to more distant parts of the country. Such a development is regarded by the members of the Society as a testimony to its own value in stimulating a popular interest in such studies, and in turn helping to further the objects which the Society has in view.

The membership of the Society now includes many earnest students, and it continues to function as a medium for the exchange of ideas and observations, and for the dissemination of the knowledge gained during numerous delightful excursions to places of interest made under the most pleasant conditions.

# PRESIDENTS

## Natural History Society of Glasgow

### Andersonian Naturalists' Society

|           |                                 |
|-----------|---------------------------------|
| 1885-1890 | Rev Alexander S. Wilson, MA BSc |
| 1890-1892 | Robert Turner,                  |
| 1892-1894 | Prof Edward E. Prince, BA, FLS  |
| 1894-1896 | George B. Todd, M.B. Ch.        |
| 1896-1899 | Malcolm Laurie, BSc BA FRSE FLS |
| 1899-1901 | John Paterson,                  |
| 1901-1902 | Hugh Boyd Watt, FRS MBOW        |
| 1903-1904 | John R. Lee, MA                 |
| 1905-1906 | John Wood,                      |
| 1907-1908 | Robert Garry, BSc               |
| 1909-1910 | James Mitchell,                 |
| 1911-1912 | John Robertson,                 |
| 1913-1914 | Prof James R. Jack, MBE NINA    |
| 1915-1916 | John G. Connell, FRMS           |
| 1917-1918 | R. B. Johnstone,                |
| 1919-1920 | Thomas Nisbet, MA               |
| 1921-1922 | Thomas Wise,                    |
| 1923-1924 | John Main, M.B.E. FGS, FELS     |
| 1925-1926 | Donald Patton, MA BSc MD FRSE   |
| 1927-1928 | E. J. A. Stewart, MA, BSc.      |
| 1929-1930 | William Russell,                |

|           |                                     |
|-----------|-------------------------------------|
| 1851-1854 | William Gourlie,                    |
| 1854-1859 | James P. Fraser, FRSE, FGS          |
| 1859-1867 | John Scouler, M.D. LL.D. FLS        |
| 1867-1869 | Hugh Colquhoun, M.D.                |
| 1869-1882 | Prof John Young, M.D. FGS.          |
| 1882-1883 | John Harvie-Brown, FRSE, FGS        |
| 1883-1887 | James Sturton, M.D. FLS.            |
| 1887-1890 | David Robertson, LL.D. FLS, FGS     |
| 1890-1893 | Prof F.O. Bower, Sc.D. LL.D. FRS.   |
| 1893-1896 | Prof Thomas King,                   |
| 1896-1899 | Robert Kidston, LL.D. FRS FRSE, FGS |
| 1899-1902 | Alexander Somerville, BSc, FLS      |
| 1902-1905 | Peter Ewing, FLS.                   |
| 1905-1908 | David A. Boyd,                      |
| 1908-1911 | John Paterson,                      |
| 1911-1914 | John R. Lee, MA.                    |
| 1914-1917 | W. R. Baxter,                       |
| 1917-1919 | James F. Gemmil MA MD BSc FRSE      |
| 1919-1920 | Mrs. E. R. Ewing,                   |
| 1920-1923 | Alexander Ross, FELS.               |
| 1923-1926 | Andrew Barclay, MBE JP, FELS        |
| 1926-1929 | Donald Patton, MA BSc, PLR, FRSE.   |
| 1929-1930 | Anderson Fergusson, FLS.            |

### The Microscopical Society

|           |                                     |
|-----------|-------------------------------------|
| 1886-1890 | Rev W H Dallinger LL.D. FRS.        |
| 1890-1895 | Prof F.O Bower, Sc.D. LL.D. FRS.    |
| 1895-1900 | Prof. Thos. King.                   |
| 1900-1905 | Prof. Thos. King.                   |
| 1905-1909 | Prof. Thos. King.                   |
| 1909-1914 | Prof L.A.L. King, MA (Cantab) FRSE  |
| 1914-1919 | Prof L.A.L. King, MA (Cantab) FRSE  |
| 1919-1924 | Prof L.A.L. King, MA (Cantab) FRSE  |
| 1924-1930 | Prof L.A.L. King, MA (Cantab) FRSE. |

## Glasgow and Andersonian Natural History and Microscopical Society

|           |                                     |           |   |           |                                       |
|-----------|-------------------------------------|-----------|---|-----------|---------------------------------------|
| 1930-1933 | John R. Lee, MA                     | 1937-1939 | William Russell.                            | 1943-1945 | John Duncan Leslie                    |
| 1934-1936 | Prof. L.A.L. King, MA (Cantab) FRSE | 1940-1942 | John G. Cree.                               | 1946-1948 | Prof John Walton, MA, Sc.D. BSc, FRSE |
|           |                                     | 1949-1951 | Prof. K. W. Braid, MA, BSc, BSc (Agr), FRSE |           |                                       |

## GLASGOW'S NATURAL HISTORY SOCIETIES

By Donald Patton, M.A., B.Sc., Ph.D., F.R.S.E.

Mr. William Rennie, who has for many years been engaged in researches into the history of naturalist societies in our area, is best qualified to write this article. However, he has asked me to prepare the following summaries. These have been gleaned from his unpublished manuscripts and notes. A more detailed account of many of the societies mentioned will be found in his booklet, "Smatterings," printed for private distribution in 1946. A very few of the entries are my own.

An outline has already been given of the history of the Natural History Society of Glasgow, the Andersonian Naturalists and the Microscopical Society of Glasgow, and of the united society. But other societies had previously amalgamated with the first mentioned society.

- (1) In 1866, the **Glasgow Naturalists' Society**. It was instituted on 6th April, 1858, formed by Dr. Lindsay's students, and met in Anderson's College. This society produced a series of manuscript magazines, the fourth volume\* of which is in our library.
- (2) In 1879, **Glasgow Society of Field Naturalists**. This society was founded in 1871. The Naturalists took an active part in the Glasgow Meeting (1876) of the British Association, the "List of the Fauna and Flora of Clydesdale and the West of Scotland" being compiled under their auspices.

Though no actual amalgamation took place, two more societies merged into the Natural History Society of Glasgow.

- (3) c. 1890, **Glasgow Practical Naturalists' Society**. Founded in 1883 in the Kelvingrove Museum, it was chiefly interested in Entomology. It met in 1884 in the then Religious Institute Rooms and from 1885 at 207 Bath Street.
- (4) c. 1898, **Glasgow Eastern Botanical Society**. This society, founded by Dr. Mathie, existed from 1876-1898. After it was wound up various books from its library were presented to the Natural

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\* This volume belonged originally to Mr. Combe and was given to me (1920) by one of his descendants. I thought Mrs. E. R. Ewing would be pleased to possess it, so I passed it on to her. After a time Mrs. Ewing thought that such a book should be in the Society's Library, to which she presented it.



History Society of Glasgow. It produced a two-volume manuscript magazine called "The Ranger."

Another Glasgow society which during its long career (since 1802) has fostered the study of the Natural Sciences is the Glasgow Philosophical Society. Intermittently it sponsored Biological sections.

- (1) **The Glasgow Botanical Society**† (1842-1887) was formed by members of Professor J. H. Balfour's class in 1842. In the following year it became the Botanical section of the Glasgow Philosophical Society.
- (2) **The Clydesdale Naturalists' Society.** (1850-1865), brought together by William Gourlie, came under the aegis of the Glasgow Philosophical Society. (See preface to Henneidy's "Clydesdale Flora.")
- (3) In 1921, Professor J. Graham Kerr convened a biological section which continued active until 1940.

To-day the General Syllabus of the Glasgow Philosophical Society includes Biological Subjects.

### **The Geological Society of Glasgow.**

A very detailed history of this flourishing society appears in Mr. Rennie's "Smatterings."

### **The Glasgow Royal Botanic Institution (1817-1887).**

The promoter of this society was Thomas Hopkirk of Dalbeth, author of *Flora Glottiana* (1813). He, with the aid of the University and some influential citizens initiated a Glasgow Botanic Garden. This was laid out at Sandyford in 1817 but, with the city expanding, it had to be removed to another site. A new garden was opened at Kelvingrove (the site of the present Botanic Gardens) on 30th April, 1842. It continued, often beset with difficulties, chiefly financial, until 1st April, 1887, when it was taken over by Glasgow Corporation.

### **Zoological Societies.**

Various attempts have been made in the past to start such societies. In May, 1844, the Glasgow Zoological Institute was conceived but it apparently proved abortive. That there was a Zoological Society of Glasgow in existence around 1890 is borne out by the fact that it arranged a joint excursion with the Zoology Section of the Andersonian Naturalists to Mount

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† Its herbarium is in the custody of the Glasgow Art Gallery and Museums.—D. P.



Stuart, Bute, on 7th April, 1890. No further reference to this society has been traced.

On 15th December, 1936, however, The Zoological Society of Glasgow was founded within the Department of Zoology, Glasgow University, where its meetings continue to be held. Calderpark Zoo, opened to the public on 9th July, 1947, has been one of this society's most successful ventures. This Glasgow Zoo, like the Royal Zoo in Edinburgh, is an entirely non-profitmaking organisation with scientific educational objectives.

In the early '80's there existed what was known as the **Union Jack Field Club**. It seems to have been a series of school clubs with Glasgow No. 1 Branch as a centre. Included in the list of City Branches (at least five) was Glasgow University Branch. Its Annual Report for 1881 begins :—

“ . . . Union Jack Field Club, Glasgow Western Branch. This club, formerly known as ‘The Glasgow Field Club and Antiquarian Society,’ has been formed for the purpose of encouraging the pursuits of Natural History in all its branches . . .” The Club appears to have faded away gradually.

Coming now to the present day, we need only mention such other prominent and active societies as The Scottish Ornithologists' Club, The Scottish Society for the Protection of Wild Birds and the Scottish Field Studies Association.

Reference is made elsewhere in these “Transactions” to the keen interest taken by Glasgow University and the Royal Technical College in Natural History societies past and present. But we cannot conclude this article without testifying to the pioneer work done by the Anderson's University, the Glasgow Mechanics' Institution† and the Anderson's College to foster the study of Biology and Geology.

† “Glasgow Mechanics' Institution—In 1823 a number of students attending the Mechanics' Class severed their connection with Anderson's University and founded new quarters. Their first Meetings were held in the gallery of an old Secession Meeting House, in Inkle Factory Lane (from Shuttle Street to North Albion Street), which was fitted up as an Institution and was known as the Mechanics' Institution and Library Room. In 1831 the Mechanics' Institution and Library removed to North Hanover Street. In 1859 the Edinburgh and Glasgow Railway required ground to extend Queen Street Station. To do this the Institution buildings had to be demolished. A new site was secured in Bath Street . . . It was not until 1861 that the premises were ready for occupation and were known as The College of Science and Art, 38 Bath Street.

Through the action of the Royal Commission on Scottish Educational Endowments (1882), The College of Science and Art and Anderson's College were re-united in 1886 as the Glasgow and West of Scotland Technical College.”

(Excerpt from “Smatterings,” by Wm. Rennie.)

## CENTENARY \* CELEBRATIONS

### THANKSGIVING SERVICE

*Members attended Divine Service in Glasgow Cathedral on Sunday, 2nd September, at 6.30 p.m. The President, Professor K. W. Braid, read the lesson, which was taken from Acts, chapter X, verses 9-20.*

*Professor Ian Henderson delivered the address as follows :—*

“ May I on behalf of the minister and kirk-session of the Cathedral extend a welcome to the Society. We rejoice with you and join with you in thanksgiving on this occasion of your centenary.

I think one reason why we extend a particularly hearty welcome to you is that you are a voluntary body. The founder members of the Society would be astonished at the way in which commercial undertakings and, above all, the state have come to finance scientific work. That kind of help is, of course, all very necessary. The cost of modern apparatus, the need to pay full time research workers makes it so. But it is none the less exhilarating to turn for a moment from endowed universities and highly subsidised research institutes to a body of men and women who in their own time, and without any financial help, are carrying out scientific work of value. One feels that thereby not only the results of scientific pioneers are being added but their spirit is being kept alive.

Then we are also glad to welcome you because by so doing we are paying tribute to the great contribution which science has made to the human spirit. One thinks of the words of Lewis Mumford about science :—‘ This displacement of limited egoistic wishes, this reference to common data and to objective methods of proof, open to all other competent men, is one of the real contributions of science to the human personality itself.’ There is no doubt about the value of scientific work for the character. The person who has learned not to leap at the first or most plausible hypothesis, or the one most flattering to his own vanity or his own prestige, who has learned that it is not enough to hold beliefs but that in addition reasons must be given to others—such a one has become not only a better scientist but also a better human personality.

Yet another reason why we welcome you is that there is a real inward kinship between the spirit of science and that of Christianity. That has not always been apparent ; indeed to some of the early members of the Society it must have been very far from being apparent. In 1860—just nine years after the founding of the Society—there occurred the celebrated brush between T. H. Huxley and Bishop Wilberforce, when, at the British Association meeting at Oxford, the former defended and the latter attacked Darwin's *Origin of Species*. Looking back on it now, Wilberforce seems unpardonably superficial and Huxley fully justified in his refusal to allow clergymen to make dogmatic statements on matters scientific, though it must be allowed that he himself never suffered from any undue reluctance to speak dogmatically on matters religious.

Into the details of the long debate between science and religion we cannot go. Occasionally its course led into the field of a not unpleasant absurdity. In his book, *Father and Son*, Sir Edmund Gosse tells how his father, an eminent zoologist, was a member of a fundamentalist body. He was well aware of the geological theories of Sir Charles Lyell, which put the origin of the world back far beyond 4004 B.C. His knowledge of fossils told in favour of the slow modification of forms and against a six day creation. To meet the discrepancy, Gosse senior maintained that at the due date, God had created the universe, fossils and all. To which Charles Kingsley, himself an Anglican clergyman, retorted that he saw no reason for believing that God had imprinted one stupendous and unnecessary lie on the rocks.

But on looking back on the struggle we must concentrate on other things than the occasional absurdity. It certainly did theology a lot of good. It was not fought out without much pain being caused to those to whom religious convictions meant much. And we must remember that those on the side of science were themselves representing a profound religious insight as old as the book of Job, the insight that you cannot get to God by by-passing facts.

Now the scene has changed. One ought not to over-estimate the improvement in relations between religion and science but equally one must not under-estimate it. Various things have helped to bring it about. We have had émigrés both scientific and religious from those countries where "mind-conditioning" and the suppression of "dangerous



thoughts " have created an atmosphere in which it is difficult for either science or religion to breathe. Partnership in misfortune has perhaps done something to make science and religion realise their common concern for the freedom of the spirit. And again when men contemplate the decline of Europe, which is one of the most distressing features of our day, they notice that two of the things which have gone to make Europe unique is that it is the birthplace of science and the adopted home of Christianity. It is natural that a contemporary thinker so profound as Karl Jaspers should ask whether there is not a connection between the two. To mention only one factor, is there not a link between the scientist's conviction that *everything* in nature is worth studying, whether it be ugly or beautiful, and the point made in the lesson from the Book of Acts, which was read to us by the President to-night, that, in the sight of God the Creator, none of His creatures is unclean.

For all these reasons we join with you in thanksgiving on the occasion of the Centenary of your Society and we wish it continued prosperity in the years to come.

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## MARINE BIOLOGY IN THE WEST OF SCOTLAND

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### SUMMARY OF PUBLIC LECTURE

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By C. M. Yonge, PH.D., D.Sc., F.R.S.

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(Delivered 8th September, 1951)

The modern study of marine life may be said to begin in the eighteenth century when the Swedish naturalist, Linnaeus, started the systematic naming of animals and plants. A contemporary was the Englishman, John Ellis, some of whose named specimens of marine animals are in the Hunterian Museum of Zoology in the University of Glasgow. Other enthusiasts included Dr. R. E. Grant of Edinburgh, who discovered that sponges were animals and not plants as they had previously been considered, and Sir John Graham Dalyell, whose studies on the animals of the Firth of Forth, many of them of great interest, were published in five impressive volumes between 1847 and 1858.



Edward Forbes, student and later Professor at Edinburgh, was among the first to dredge along the west coast. From his pioneer work comes, by way of Wyville Thompson, the famous *Challenger* Expedition (1872-76) which laid the foundations of the modern science of oceanography.

Meanwhile popular interest grew in the west, a notable figure being the Rev. David Landsborough of Saltcoats who wrote books on zoophytes and seaweeds as well as his well known *Excursions to Arran*. He did much dredging around Arran and the Cumbraes. But the great figure is certainly that of David Robertson. He was intimately associated with the Natural History Society of Glasgow and its President from 1887-1890.

A self taught man, Robertson became increasingly interested in marine biology and, as soon as he could, settled in Millport. There he collected, observed and described the animals on the shores and others he dredged from the sea bottom. Amongst other biologists he entertained a young German zoologist, Anton Dohrn, who was later to found the famous zoological station at Naples. The establishment of this owes much to Robertson at Millport.

Meanwhile in Edinburgh the results of the *Challenger* Expedition were being edited by John Murray. In 1884 he helped to found a Scottish Marine Station at Granton where a barge, the *Ark*, which housed a wooden laboratory, was moored in a flooded quarry. The following year the *Ark* was towed by Murray's steam yacht, the *Medusa*, through the Forth and Clyde Canal. It never returned, finding its final home at Millport, where it was beached and continued to be used by Robertson and by visiting scientists until destroyed by a great storm in 1900.

From this union of the work of Robertson on the west and of Murray on the east springs the Scottish Marine Biological Association with its Marine Station at Millport and, since 1950, its Oceanographic Laboratory in Edinburgh. The first building was opened at Millport in 1897 and there have since been repeated additions, including those now being made. For over forty years it was under the care of a great field naturalist, Richard Elmhirst. The simple collections and observations of the early naturalists have developed into elaborate surveys and experiments and these are carried out in a modern laboratory and from a fully equipped research vessel. The Millport laboratory is now one of the major centres in the world for research into the fundamental problems of marine life and in particular the factors controlling productivity in the sea.

## SPECIAL EXCURSIONS ON THE OCCASION OF THE SOCIETY'S CENTENARY

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### BEN LAWERS (DAY) EXCURSION

SATURDAY, 7TH JULY, 1951

Ben Lawers had to be the Venue of the all day excursion. This mountain recalls the names of so many of our honoured and departed members:—Walker Arnott, F. O. Bower, Robert Brown, Peter and Elizabeth Ewing, James Jack (Airdrie), James R. Jack (U.S.A.), Robert Kidston, George Lunam, Thomas McGrouther, William Pettigrew, Alexander Somerville, R. & T. Wilkie, Thomas Wise.

What memories the Ben holds for those of us who have botanised in this historical area!

The party arrived by bus at the Carie Burn where the contingent which was spending the week at Killin met us. The fit climbed the Ben, the not-so-fit botanised the shore of Loch Tay. The bus party finished the day with a hearty meal at Ben Lawers Hotel, so well known to botanists both north and south of the Border.—DONALD PATTON.

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### FIELD MEETING AT KILLIN

6TH-13TH JULY, 1951

A party, made up of the following members, spent a week at Killin, after the Society's one-day alpine excursion to Ben Lawers:—

Professor K. W. Braid, Messrs. John R. Lee, John Boyd, Mrs. Glen, Misses Bain, I. J. Dunn, Mabel Scott, Phyllis Woodland, E. Headley, J. Chapman, Mr. and Mrs. Anderson, and Mr. and Mrs. Middlemast.

We were accommodated at different places in the village, but a party of eight was housed at Tighnabruaich Private Hotel and this was made our headquarters, all the members coming together after the evening meal for the "post-mortem." The morning papers were carefully spread over the drawing-room carpet and all the day's gathering conscientiously and noisily conned, with frequent appeals to the referees. By supper time the room looked like Covent Garden on Saturday morning.

We must pay tribute to the long suffering proprietors, Mr. and Mrs. Dalziel, and their staff, for their forbearance in this respect, for the avalanche of wet boots to be dried each evening, and the language used. Words like "*Thalictrum alpinum*" or "*Trientalis europaea*" were bandied about all evening to the astonishment of the other guests whose vocabulary was not so rich (botanically!).

We had an interlude one evening to listen to the B.B.C., when Mr. George Waterston, Secretary of the Fair Isle Bird Observatory Trust, in replying to a question on Nature Study, made a special announcement about the Society, its aims and objects, and the fact that it was now celebrating its Centenary.

We have the happiest memories of this week, of Mr. Lee's genial omniscience, Professor Braid's kindly helpfulness on every possible occasion, Mr. Boyd's stout defence against the attacks of the Misses Scott, Dunn and Woodland on his knowledge of the fauna as well as the flora; a fine period of leisurely fellowship in which, with a different excursion each day, we covered most of the district.

We would suggest the advisability of the Council reviving an annual week to develop the community of interest for which we find so little time at our monthly meetings.

JAMES ANDERSON, *Field Secretary*.

## ARCTIC-ALPINE FLORA

NOTE BY JOHN BOYD

During our week at Killin we made two incomplete ascents, one of Ben Lawers on 7th July, and the other of Craig-na-Cailliach on the 11th. Over thirty species of arctic-alpines were found.

On ascending the burns, the first of the mountain plants to be discovered was the alpine bistort, *Polygonum viviparum*. This (quite distinct from its lowland relatives in virtue of the small brown bulbils below the white flowers) was soon followed by alpine lady's mantle, *Alchemilla alpina*, and mountain sorrel, *Oxyria digyna*, with its kidney-shaped leaves.

Apart from the few saxifrages which occur at a relatively low level in our Clyde area there was nothing of outstanding interest for the next thousand feet, after which appeared mossy campion, *Silene acaulis*, with its beautiful green cushions



plentifully bestarred with reddish flowers; these gave the same effect as wild thyme in the lowlands. Next came an occasional flower of purple saxifrage, *Saxifraga oppositifolia*, most plants, however, being in fruit. Then followed cushions of mossy cyphel, *Cherleria sedoides*, with numerous but inconspicuous yellowish-green flowers.

Before leaving the burn we found two highland forms of sea-shore plants—scurvy grass, *Cochlearia alpina*, and *Armeria vulgaris*, the thrift of our threepenny bits.

Striking up through the boulder strewn heather, we now observed the small alpine meadow rue, *Thalictrum alpinum*, and in the sphagnum nearby, the Scottish asphodel, *Tofieldia palustris*.

Of especial beauty in this region was the alpine mouse-ear chickweed, *Cerastium alpinum*; tall and large flowered, of a pure white, so that it looked more like *Stellaria Holostea* than a *Cerastium*.

Finally on the barest and most windswept ridge where we turned back, we discovered the dwarf cudweed, *Gnaphalium supinum* and *Salix herbacea*, our smallest British willow.

It may be of interest to entomologists to know that on the descent of Lawers, we saw half a dozen small mountain ringlet butterflies, *Erebia epiphron*, fluttering about during a brief spell of sunshine.

Two groups of our party had private outings to the rock-ledge of Creag-an-Lochain, where, in addition to the above, were found:—*Draba incana*; *Salix arbuscula*; *Dryas octopetala*; *Potentilla Crantzii*; *Sedum Rhodiola*, rose-root, growing in large clumps like cabbages; *Bartsia alpina* in bud; *Orchis mascula*, the early purple orchis, just past its best; *Habenaria viridis*, frog orchis, recently out. (Both these orchids were far larger and more robust at 1,500 feet than any I have seen in more sheltered lowland districts; they were remarkable also for being in flower at the same time, a full month elapsing between the blooming of each at sea-level.) *Juncus triglumis*; *Carex capillaris*; *Polystichum Lonchitis*, the holly fern; *Woodsia hyperborea*, small immature specimen.

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## PUBLIC EXCURSIONS

Three outings open to the general public took place during the month of September.



The first was held on Saturday afternoon, 15th September, starting from the bus terminus at Mugdockbank near Milngavie. About forty persons attended, and an enjoyable afternoon was spent in fine weather. The route followed was by the "right-of-way" past Mugdock Castle to the road leading to the Allander Bridge near Craigallion, from which point the return journey was through the Allander Woods to Milngavie. At the outset it was announced that members of the Society present would be prepared to answer as far as possible any questions regarding the natural history of the locality. Many objects of interest were observed during the walk, and attention was called to special features—geological, botanical, ornithological, and entomological—which were noticed. Questions raised for discussion and explanation were many and varied and much satisfaction was expressed by those attending.

On the following Saturday afternoon, 22nd September, the objective chosen was the Fossil Grove, Victoria Park, to which a company of over fifty persons gathered to hear an interesting account of this unique palaeontological feature by Professor John Walton. As the accommodation for spectators here is limited, the company present divided into two parties who were addressed separately by Professor Walton from the two ends of the building. Attention was drawn to the features of this geological curiosity from which much information can be gleaned regarding the conditions of forest vegetation in carboniferous times, and the probable subsequent happenings by which, fortunately, the preservation of these fossil forms took place. After leaving the Fossil Grove, some time was spent by many of the party in an examination of the beautiful rock garden near by.

The third outing, on Saturday afternoon, 29th September, was a visit to the Botanic Gardens, where again a large company (about fifty) was present. The party was conducted over the grounds and conservatories by the Curator, Mr. Douglas, who called attention to, and explained the most important and interesting features of, the various types of vegetation of which the city's collection is composed.—JOHN R. LEE.

## THE DINNER

A Dinner was held in the Ca'doro Restaurant, Glasgow, on Friday, 7th September, 1951, at which members entertained guests of kindred associations. Professor Braid presided over a company of 90.

Congratulatory messages were read from the Royal Philosophical Society, the Glasgow branch of the Scottish Ornithologists' Club, the Paisley Naturalists, Professor Louis Renouf (Cork).

The President proposed the toast of "The King."

Dr. Donald Patton, in proposing the toast "The City and Corporation of Glasgow," put forth the suggestion that Glasgow had adopted its coat of arms from the Emblem of a Natural History Society which existed from about the year 1200. Like ours, this Society had several sections, viz. :—

- (a) Botanical—as evidenced by the Oak Tree proper.  
Plant Physiology was not far advanced in those days—the tree never grew.
- (b) Ornithological—indicated by the Robin.  
Vivisection seems to have been practised then for the robin's head was cut off. Later, however, it was replaced and life restored, though the poor bird did not fly.
- (c) Ichthyological.  
Our city forefathers beat us here. We have no section for fishes. One salmon at least is recorded as having been taken with a gold signet ring. To-day anglers use the Golden Sprat! Then why, on the emblem, should another of the salmon be shown lying on its back? No doubt this indicates river pollution, even in these far off days. By the way, the convener of this section was a Glasgow Magistrate!
- (d) Geological.  
This section studied mineralogy. Its quest was the source of Bell Metal and Gold.

The Society appears to have concluded their meetings with this benediction—"Let Glasgow Flourish by the Preaching of the Word." There are no Minute Books or Publications extant. This Society appears to have lapsed several times; but it had frequent revivals, since we read of great local interest being taken, at certain times, in plant life, *e.g.* tobacco, tea,

cotton, sugar, etc., and in coal. Dr. Patton said that during the past one hundred years the City and Corporation of Glasgow had shown their interest in our Society and he expressed how much the Society had been indebted to them in the past and how much their support is appreciated.

Bailie Arthur G. Murray in replying expressed his thanks and spoke of the achievements and aims of the Corporation.

“The Society” was proposed by Professor James Todd, head of the Biology and Microbiology Department at the Royal Technical College. He congratulated the Society on the varied activities held to mark the centenary of its foundation; he said that the Exhibition was one of the finest he had seen for a long time and was on model lines for teaching. The Society was indeed fortunate in retaining the name of Anderson in its title. John Anderson was a pioneer in social and technical education; the Institution to which he belonged was the first of its kind and a prototype not only in this country but in other countries. He felt that there was something lacking in failing to recognise the pioneer’s work; it might have been called the Anderson College of Technology rather than its present localised title, for he believed that tradition was a great thing and ought to be maintained. The Anderson College of Technical Education and the Anderson Society of Natural History were pioneers in adult education. The Society must have been the means of instructing hundreds in the beauties and mysteries of nature and still had a very vital part to play to-day in arousing the interest of people in the Natural Sciences.

Professor Braid in his reply recalled some of the highlights in the Society’s history; of the nine original foundation members, four were Grays—Thomas (conchology) and his brother John (entomology), Robert (author of the *Birds of West Scotland*) and his brother Archie; the others were James P. Fraser (geology) who called the original meeting, Thomas Ferguson (entomology and ornithology) and his older brother William, who, with Dr. W. S. Lorraine, was interested generally in Natural History, and William Gourlie (botany and conchology). This group of six families had met in each others’ homes during the “forties” to discuss their hobbies. They met again on the ninth of July and elected Dr. Scouler from Dublin to be Honorary President and he delivered the first talk on *The Symmetrical Arrangement of Plants and Animals*.

Two others were added to the roll of original members—William Keddie and H. Colquhoun. Mr. Lee had summarised



the history of the Society but he had not emphasised the friendliness of the members towards enquirers, of which he himself is a past master.

Professor Braid also spoke of family members, fathers and sons, and brothers: the two Mr. Russells, the two Mr. Robertsons, the two Mr. Johnstones, and others. Mr. Thomas Robertson has continued his father's records of the Arrival of Migrant Birds so that the records cover a period of 57 years. He said that he did not know whether the Society inherits the sons, or the sons inherit the Society, but the Society is proud of the association.

Professor Braid concluded by saying that the founders had set out to work on definite projects and he thought the Society might profitably return to that type of development to-day.

Mr. Johnstone was associated with Professor Braid in replying to the toast of "The Society"; he said that he regretted Mr. Lee's absence, since his long membership covering 60 years, made him the incomparable speaker to reply to this toast. Mr. Johnstone's own memories went back quite a long way to the end of last century when he attended excursions with his father and came into contact with what were then young and active members:—John Paterson, John R. Lee, George Herriot, Hugh Boyd Watt. He spoke of the encouragement given to the Society by the University, various distinguished professors having been presidents. He said that members of the Society were not likely to compete with the professional specialists, but could do much useful work if the University would point the way.

Mr. Johnstone commented upon our tendency to look upon our forebears as grave and earnest men, given to high thinking even if also high living, but found from perusal of old minutes that they had their foibles and were at times apt to make a great pother about nothing. He instanced the case of the eminent naturalist who, after some twenty years, suddenly demanded a refund of £20 which he said he had lent on condition that it be used for certain purposes and these had not been carried out. Stormy sessions were held at which the matter was debated at great length; in the end he won and got his money back, with interest too, thus proving that a good naturalist need not be lacking in financial acumen.

Another storm arose when the Librarian accused the Secretary of showing snobbishness in printing names of new members in some supposed order of merit and not strictly in order of nomination. The Librarian was prepared to concede that



peers of the realm, baronets and knights would justly take precedence but when it came to commoners all were equal. The Secretary hotly denied the charge. The Librarian was not satisfied and took the extraordinary step, not of resigning office, but of intimating that he refused to carry out his duties (or presumably to permit any one else to do so) until he had received definite assurance that his grievance would be remedied. It is scarcely to be credited but the dispute came up month after month at council meetings. Eventually it disappears from the minutes without any definite decision being recorded. We can only conclude that good sense prevailed at last.

A sidelight on social customs is shown by a minute of a meeting held in the 1860's. The Council was asked whether ladies were eligible for membership. It came to the sensible conclusion that as the Constitution did not specifically debar ladies, the expression "member" might be taken to be feminine as well as masculine. There was no great influx of ladies as the result of this decision. A few years later the only lady member applied for her membership to be suspended as she was leaving the country temporarily. Members of the present day should note the privilege of suspended membership is not open to them. At the present time ladies form at least one third of the membership, and even hold high office. That would probably have been more than the Council of 1860 could have contemplated.

Miss Mabel G. Scott proposed the toast of "Our Guests." These included Bailie Donald and Bailie Murray, Rev. Professor Ian Henderson, Professor Todd, Dr. Stuart Henderson of the Glasgow Museum, Dr. John Berry, Director of Nature Conservancy in Scotland, Mr. John Douglas, Curator of the Botanic Gardens; Professor John Walton of the Chair of Botany, one of our own members, lately our President, representing the University, and Professor C. M. Yonge, of the Chair of Zoology, who is also a member of the Society, representing the Marine Biological Association. There were also representatives from the Knightswood Aquarists, the Scottish Ornithologists' Club, the Royal Botanical Society of Edinburgh, the Glenfield Ramblers, the Natural History Societies of Perthshire, Paisley, Buteshire, Dumfries and Galloway. Miss Scott said that one of the especial pleasures of a gathering of this kind was the fact of being among kindred spirits, who understood the nature of our pursuits and equipment, and the endless satisfaction we derive from the contemplation of nature: whether it were in their readiness to

“stand and stare,” to carry around the geologist’s hammer, butterfly net or binoculars, to fathom the mystery hidden in the depths of a sea-shell, or wonder at the symmetry of a diatom, members and guests were united by bonds of understanding and sympathy.

Professor Walton and Mr. Robert Wilson of the Glenfield Ramblers replied. Professor Walton paid tribute to the debt which the University owed to members of the Society who, as non-professional botanists, zoologists and geologists had made very useful contributions to the study of these sciences.

It was announced that honorary membership of the Society, on the occasion of the Centenary, had been conferred on Sir Victor Warren (Lord Provost of Glasgow), Sir Hector Hetherington (Principal of Glasgow University), Dr. D. S. Anderson (Director of the Royal Technical College), and Dr. John Berry (Director of the Nature Conservancy in Scotland). Dr. Berry thanked the Society for the honour conferred on him, and spoke of the aims of the Conservancy.

Acknowledgements were made by Dr. J. Inglis Cameron, particularly to the Secretary, Miss Jean C. D. Craig, for so ably carrying through the many arrangements necessary for the Centenary Celebrations.

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## THE EXHIBITION

The Exhibition was formally opened on the afternoon of Saturday, 1st September, 1951, by Bailie Arthur G. Murray, Bailie Andrew Donald presiding. Bailie Murray emphasised the importance of giving a little time to the world around us when so many people are absorbed in daily work.

Professor Braid thanked Bailie Murray for opening the Exhibition, and through him the Art Gallery and Museums Committee for the privilege of holding it in the Museum; and Dr. Honeyman, Dr. Henderson and their staffs for the assistance given. He said that most civic museums arose in response to the activities and enthusiasm of local naturalists; in the Proceedings of the Natural History Society of Glasgow for 1881 there was noted an arrangement made between the Lord Provost, Magistrates and Council of the City of Glasgow and the Society for the supply of collections of plants and invertebrata for the Kelvingrove Museum, and by January, 1883, a first consignment of over 500 species had been handed over. Professor Braid thought the Exhibition in many respects

represented the earlier Naturalists' Museum. He remarked upon the very great difference between the early museums with their volunteer labour and modest housing and the large civic museums, of which, apart from National Museums, no city in Britain had finer than Glasgow. He said that museums aim at showing objects with their natural backgrounds, but that they should nevertheless be used like Reference Libraries as places to be consulted, places which should lead to the study of nature in the wild ; the Exhibition now opened invited the observer to realise that the memory of a perfect day in the country, whether it be spent watching birds, studying wild flowers, collecting agates or fossils, is a treasure in his memory, which is part of his make-up for life.

We are indebted to Mr. Cannon for supplying the details of the lay-out of the Exhibition.

It was felt that an exhibition to be worthy of the great names and great achievements in our Society's past 100 years ought to be better than anything of the kind ever staged by a similar body in Scotland. The members chosen to organise it would require the ability of persistent effort and the strength to rise above many disappointments. In other words, they would have to plan, re-plan, and plan again, and, at the same time, retain their enthusiasm.

An exhibition committee was chosen, and this consisted of the following twelve members under the convenership of Mr. Cannon :—

|                       |       |                                    |
|-----------------------|-------|------------------------------------|
| PROFESSOR K. W. BRAID | ...   | Botanical                          |
| Dr. DONALD PATTON     | ' ... | Botanical                          |
| WILLIAM RENNIE        | ...   | Botanical                          |
| RICHARD PRASHER       | ...   | Botanical ( <i>Convener</i> )      |
| A. MACLAURIN          | ...   | Entomological                      |
| JAMES GRAHAM          | ...   | Entomological                      |
| JAMES ANDERSON        | ...   | Microscopical ( <i>Convener</i> )  |
| THOMAS ROBERTSON      | ...   | Ornithological ( <i>Convener</i> ) |
| C. ERIC PALMAR        | ...   | Photographical ( <i>Convener</i> ) |
| JOHN WEIR             | ...   | Zoological                         |
| JAMES KIRKWOOD        | ...   | Geological                         |
| WILLIAM J. CANNON     | ...   | Geological ( <i>Convener</i> )     |

The exhibition was arranged in eight sections, utilising thirty-nine cases and screens. Each case was the responsibility of an individual member whose efforts were subject to the approval of the committee as a whole. Thus it was thought that the initiative and individuality of the members would find expression and help to counteract the flat uniformity of presentation from which many exhibitions suffer.



The faith thus reposed in our fellow members was amply justified as the success of the exhibition demonstrated. The measure of success can be gauged from the fact that 48,694 persons visited the exhibition. There were 23 conducted parties from Glasgow schools, and 73 new members were enrolled.

The exhibition was officially open from the 1st till the 30th September, but the majority of the exhibits were retained on display for a further month at the express request of the museum authorities. It is gratifying to note, in addition, that the majority of the exhibits were the property of members and, indeed, a good number of them were collected expressly for the exhibition.

The cases, screens and tables were numbered consecutively. The names of the members responsible for the exhibits and a concise description of the contents of each case were as follows :—

### ORNITHOLOGY

1. BEAKS, FEET & FEATHERS. Many birds are very difficult to identify, but their feathers, beaks and feet give us valuable information. Examples of the beaks and feet of birds of prey, seed-eating birds, swimming birds, wading birds and others were shown. The differences are related to the birds' habits.—C. ERIC PALMAR.

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2. SEASONAL VISITORS. Examples of birds which visit the Clyde Area from further south during the summer, and others from northern regions which appear in the winter.  
THOS. ROBERTSON.

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3. BIRD MIGRATION. Screen showing the arrival dates of summer visitors in the Clyde Area, compiled from the Society's records. Charts illustrating migration waves and some of the results obtained from ringing birds in this district.—THOS. ROBERTSON.

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4. BIRD RINGING. By fixing small, numbered, metal rings to birds' legs, ornithologists obtain proof regarding the movements and ages of birds. Samples of these rings were shown together with a model of a bird trap.  
C. ERIC PALMAR.

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5. BIRDS' EGGS. Eggs vary enormously in colour, shape, size and texture. This variation is frequently correlated with the birds' nesting habits. Examples of different types showing this huge variation were displayed.  
C. ERIC PALMAR.



## ZOOLOGY

6. **INTERDEPENDENCE OF ANIMAL LIFE.** From simple substances and sunlight plants build up the carbohydrates, fats and proteins which are essential for animal nutrition. Hence a herbivore like the rabbit feeds on plants, carnivores like the stoat and eagle eat the rabbit while the stoat itself is a prey for the eagle.—JAMES GRAHAM.

## BOTANY

7. **TREE SECTIONS.** Specimens showing Annual Rings, Growth of Bark and other features.

Professor K. W. BRAID.

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8. **WATERCOLOURS OF WILD FLOWERS.** Some water-colours of wild flowers illustrating the work of a member.

PHYLLIS WOODLAND.

## PHOTOGRAPHY

9. **NATURE PHOTOGRAPHY.** Nature Photography started in the Clyde Area about sixty years ago. A notable early exponent was Charles Kirk some of whose work equals the best taken to-day.—Dr. J. INGLIS CAMERON.

## BOTANY

10. **FERNS.** About twenty species of wild ferns growing in moss, ranging from that ubiquitous pest the bracken to such a delicate plant as the filmy fern. Among the less common types were the hart's-tongue, oak, beech, and holly ferns. Ferns are unlike flowering plants in that, apart from the few which may be propagated by budding, they reproduce by spores instead of seeds.—Mrs. MARY GLEN.

## PHOTOGRAPHY

11. A set of magnificent photographs illustrating the life history of the eagle, taken and exhibited by C. ERIC PALMAR.
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12. **CAMERAS, ANCIENT & MODERN.** There was also shown an example of what may well prove to be the earliest miniature.—DAVID BUCHANAN.
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13. **AQUARIUM.** Living minnows and plants from Loch Ard in a natural setting.—W. J. CANNON.

14. NATURAL HISTORY EQUIPMENT. Equipment for collecting marine specimens : plankton nets, etc.  
JAS. GRAHAM.
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15. HISTORICAL DOCUMENTS. A selection of early minute books, first volumes of the Society's Transactions, etc.  
JAS. GRAHAM.
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16. NATURAL HISTORY BOOKS. Books are the most useful tools of the student of Natural History. Some useful volumes covering all branches of Natural History were available for reference by the public. This display was arranged by the Glasgow Corporation Public Libraries.
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17. HISTORICAL DOCUMENTS. A selection of early members' letters, manuscripts and books.—JAS. GRAHAM.
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18. NATURAL HISTORY EQUIPMENT. Collecting and preserving equipment, among which were the botanist's vasculum, the geologist's hammer, and the zoologist's butterfly-net.—JAS. GRAHAM.

### MICROSCOPY

19. MICROSCOPES. A field microscope, used in sugar plantations (c. 1850), complete with wood case, stand, dissecting instruments and mica-covered bone slides.

George Bentham's Microscope (by kind permission of the University Court) ; the owner was the Bentham of Bentham and Hooker's *Handbook of the British Flora*.

Binocular *Ross-Zentmayer* Microscope (c. 1878) with Wenham-Ross high-power prism and Zentmayer swinging sub-stage. A fine example by the makers of this period whose aim was not simplicity but perfection.

*Watson* modern research microscope, with binocular body, inclined eyepieces and interchangeable monocular body.—JAS. ANDERSON.

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20. PHOTO-MICROGRAPHS. Photographs, taken through the microscope, of objects normally invisible to the unaided eye. Great skill is required in the production of these photographs both in the micro-technique and in the photography.—REV. J. B. WANLESS.

## BOTANY

21. **MOSESSES, ETC.** Some of the characteristic types of the mosses, liverworts and lichens of the West of Scotland. These plants are often difficult to identify without the aid of a microscope, but they have the advantage of being able to be dried and studied in the darker days of winter.—**JOHN R. LEE.**
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22. **PHOTO-MICROGRAPHS OF MICROSCOPIC PLANTS.**

**JAS. ANDERSON.**

## GEOLOGY.

23. **FOSSIL PLANTS.** During lower carboniferous times there was considerable volcanic activity in Scotland and showers of volcanic ash buried forests and other vegetation, just as the eruption of Vesuvius buried Pompeii.

**PROF. J. WALTON.**

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24. **THE FOSSIL TREES, Arran.** Specimens and sections. Fossil Plants from below the Clyde Plateau Lavas in the Kilpatrick Hills, Dunbartonshire.—**PROF. J. WALTON.**
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25. **TRACES OF EARLY MAN.** Sketch map showing the distribution of some prehistoric monuments in the Clyde Area. Copy of Major-General Roy's famous survey of the Antonine Wall. Photographs, etc.—**JAS. KIRKWOOD.**
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26. **FOSSILS FROM BROCKLEY, LANARKSHIRE.** An assemblage of Fossils, with indications of the types, from the locality of Brockley, on the Poniel Water, near Lesmahagow. Shells, corals, fish-teeth, and the broken remains of sea-urchins and sea-lilies (crinoids) are found in profusion in the muddy shales of this carboniferous seabed.—**WM. J. CANNON.**
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27. **LOCAL GEMSTONES.** Mainly agates ("Scotch Pebbles") from local sources. As some volcanic lavas solidify, gas-bubbles form cavities which are infilled with a siliceous gelatinous material which hardens to jasper, chalcedony or opal according to minor variations. Should the infilling be gradual several types of mineral may be included in layers forming agate. Specimens were shown rough as well as cut and polished.—**WM. J. CANNON.**



28. **GEOLOGICAL PHOTOGRAPHS.** These photographs were changed regularly during the period of the exhibition and illustrated such subjects as Columnar Structure in lava flows, Raised Sea-Beaches, Normal and Reversed Faulting in Rocks and Fossil Sun-cracks.—WM. J. CANNON.
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29. **MINERALS OF THE CLYDE AREA.** A selection of large specimens of local minerals comprising feldspars, calcite, dolomite, siderite, quartz (in many types), fluorspar, zeolites (basic aluminium silicates for which the Kilpatrick and Renfrewshire Hills are famous), and hydrocarbon compounds.—WM. J. CANNON.
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30. **ORES OF THE CLYDE AREA.** Gold washed from the burns of the Leadhills district, native copper from Barrhead, lead and zinc ores from Wanlockhead and Leadhills give an idea of the variety of metals found locally. Gold, copper, lead and zinc have all been worked in the past, and account-books are in existence giving detailed costs for the sixteenth century gold-mines on Douglas Moor, near Abington. Silver-mines may still be seen in the Bathgate Hills. Specimens were also shown of some of the gangue or vein minerals.—WM. J. CANNON.

### ENTOMOLOGY

31. Collection of typical species of butterflies and moths taken in the area. A display illustrating variation in a species, camouflage, mimicry, flower-attraction and hibernation.

ALAN W. MACLAURIN.

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32. Local beetles, dragonflies, bees, flies, etc., with life-cycles of the most important groups.—JOHN BOYD.

### BOTANY

33. **WILD FLOWERS.** This was a display of living wild flowers illustrating the range and variation of plants found in the immediate vicinity of Glasgow. As the exhibition was held in the autumn many of the specimens were in the fruiting stage. Habitats were indicated wherever possible.—RICHARD PRASHER.



34. CONIFERS. A collection of cones and branches illustrating the variety of coniferous trees commonly seen in the area. Types shown included pine, cedar, cypress, spruce, larch and redwood.—MRS. C. E. PALMAR.
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35. FRUITS. A fruit chart showing a relatively simple method of classification. This acted as a background to actual specimens from such plants as broom, willow-herb, sycamore, rose and bramble which illustrate the types.  
MRS. C. E. PALMAR.

### ZOOLOGY

- 36 & 37. FRIENDS & FOES OF THE FARMER. Display of the Mammals and Birds which affect the balance of the farmer's economy. Predators on stock and grain, and insect-eating birds. Earth-burrowing animals showing the types of service and disservice rendered to the farming community.—DR. ALEX. R. HILL.

### BOTANY

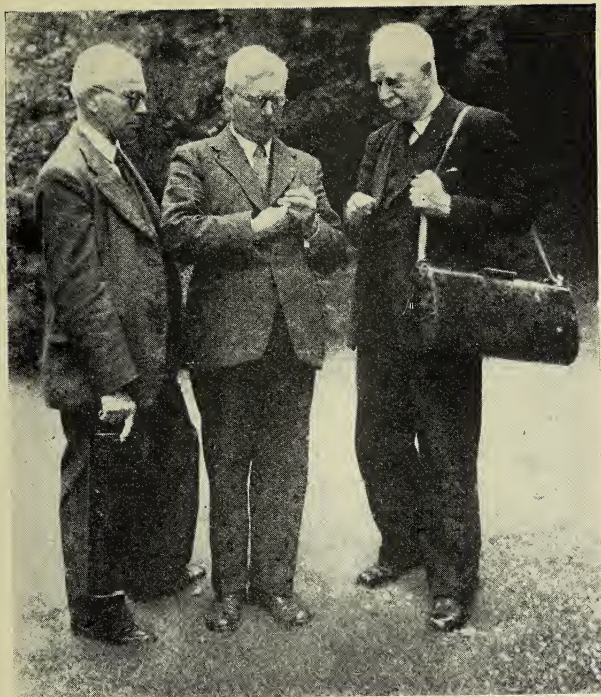
38. PLANTS OF THE SEA-SHORE. Model showing various types of maritime vegetation, including Salt-marsh, Sand-dunes, and Shingle-beach. Pressed specimens of plants were shown behind the model and these were linked to their typical habitats.—MISS A. R. HUTCHISON.

### ZOOLOGY

39. LIFE OF THE SEA-SHORE.—The vegetation of the sea-shore is usually seen to be in zones parallel to high-water mark. Any animal life which feeds or lives on the shore also tends to be found in the zone where its food or home occurs. Examples of this zonation were shown.

JOHN WEIR.

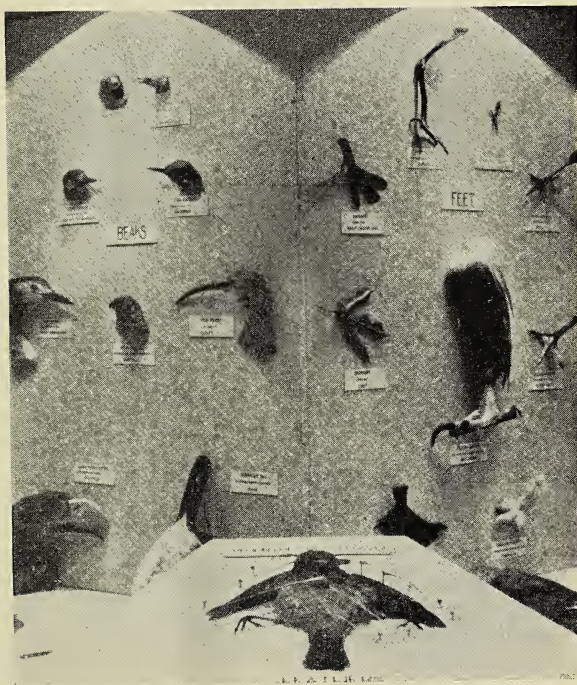
One of the tasks which assumed gigantic proportions and yet was probably unnoticed by the visitors to the exhibition was the printing of labels. Some indication of the enormity of this work can be gained from the fact that two hundred had to be printed for the wild flower table alone and every one had to be done by hand. Many members assisted in this labour, our especial thanks being due to Misses M. McKinna



### IN THE FIELD

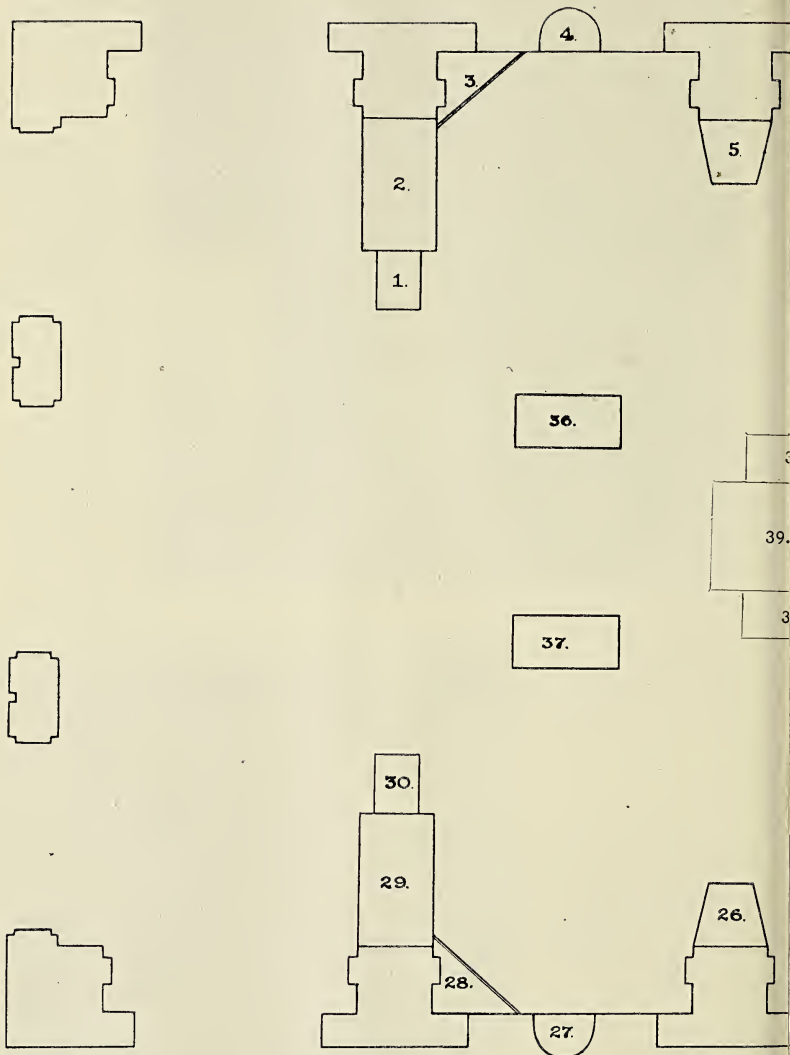
*Left to Right — Dr. Donald Patton, Past President; Professor Braid, President; Mr. John R. Lee, Past President.*

### BEAKS, FEET and FEATHERS (Case I)



*By Permission of Glasgow  
Art Gallery and Museum*

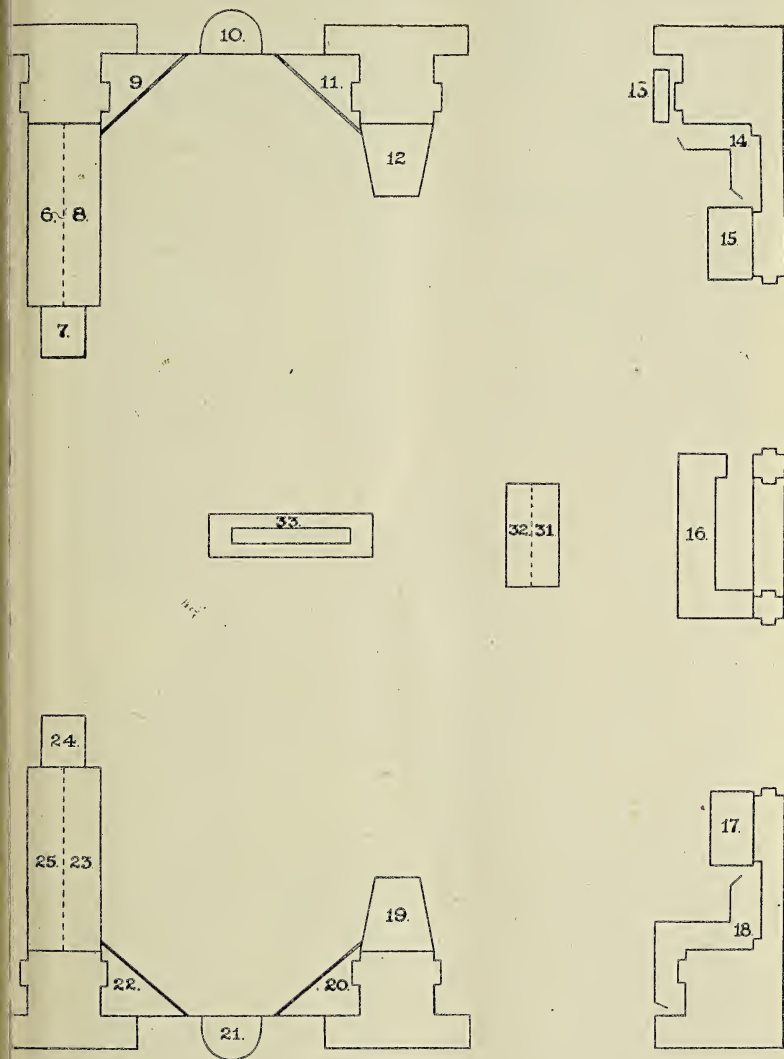
# Plan of



- |  |                                |
|--|--------------------------------|
| 1 Beaks, Feet and Feathers                 | 11 Photographs                 |
| 2 Seasonal Visitors                        | 12 Cameras                     |
| 3 Bird Migration                           | 13 Aquarium                    |
| 4 Bird Ringing                             | 14 Marine Collecting Equipment |
| 5 Birds' Eggs                              | 15 Historical Documents        |
| 6 Interdependence of Animal and Plant Life | 16 Book Counter                |
| 7 Tree Section                             | 17 Historical Documents        |
| 8 Watercolours of Wild Flowers             | 18 Natural History Equipment   |
| 9 Photographs                              | 19 Microscopes                 |
| 10 Ferns                                   | 20 Photo-micrographs           |



# Exhibition



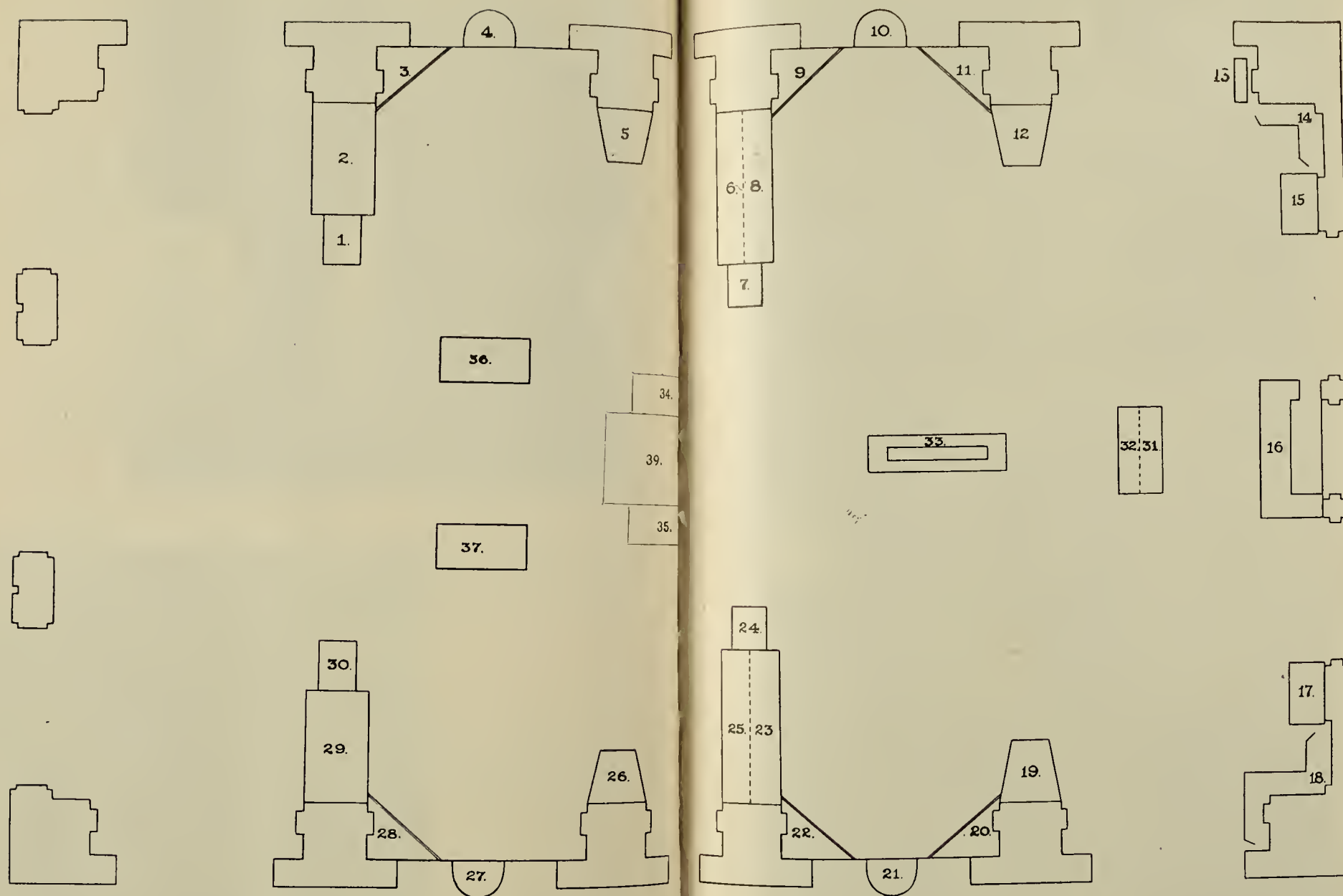
Uses  
 Pto-micrographs  
 Soil Plants  
 Soil Tree—Arran  
 Trees of Early Man  
 Soils from Brockley, Lanarkshire.  
 Soil Gemstones  
 Geological Photographs  
 Minerals of the Clyde Area  
 Plants of the Clyde Area

31 Butterflies and Moths  
 32 Flies, Beetles, &c.  
 33 Wild Flowers  
 34 Conifers  
 35 Wild Fruits  
 36 Friends of the Farmer  
 37 Foes of the Farmer  
 38 Plants of the Seashore  
 39 Life of the Seashore





# Plan of Exhibition



1 Beaks, Feet and Feathers

2 Seasonal Visitors

3 Bird Migration

4 Bird Ringing

5 Birds' Eggs

6 Interdependence of Animal and Plant Life

7 Tree Section

8 Watercolours of Wild Flowers

9 Photographs

10 Ferns

11 Photographs

12 Cameras

13 Aquarium

14 Marine Collecting Equipment

15 Historical Documents

16 Book Counter

17 Historical Documents

18 Natural History Equipment

19 Microscopes

20 Photo-micrographs

Mosses

Photo-micrographs

Fossil Plants

Fossil Tree—Arran

Traces of Early Man

Fossils from Brockley, Lanarkshire.

Local Gemstones

Geological Photographs

Minerals of the Clyde Area

Ores of the Clyde Area

31 Butterflies and Moths

32 Flies, Beetles, &c.

33 Wild Flowers

34 Conifers

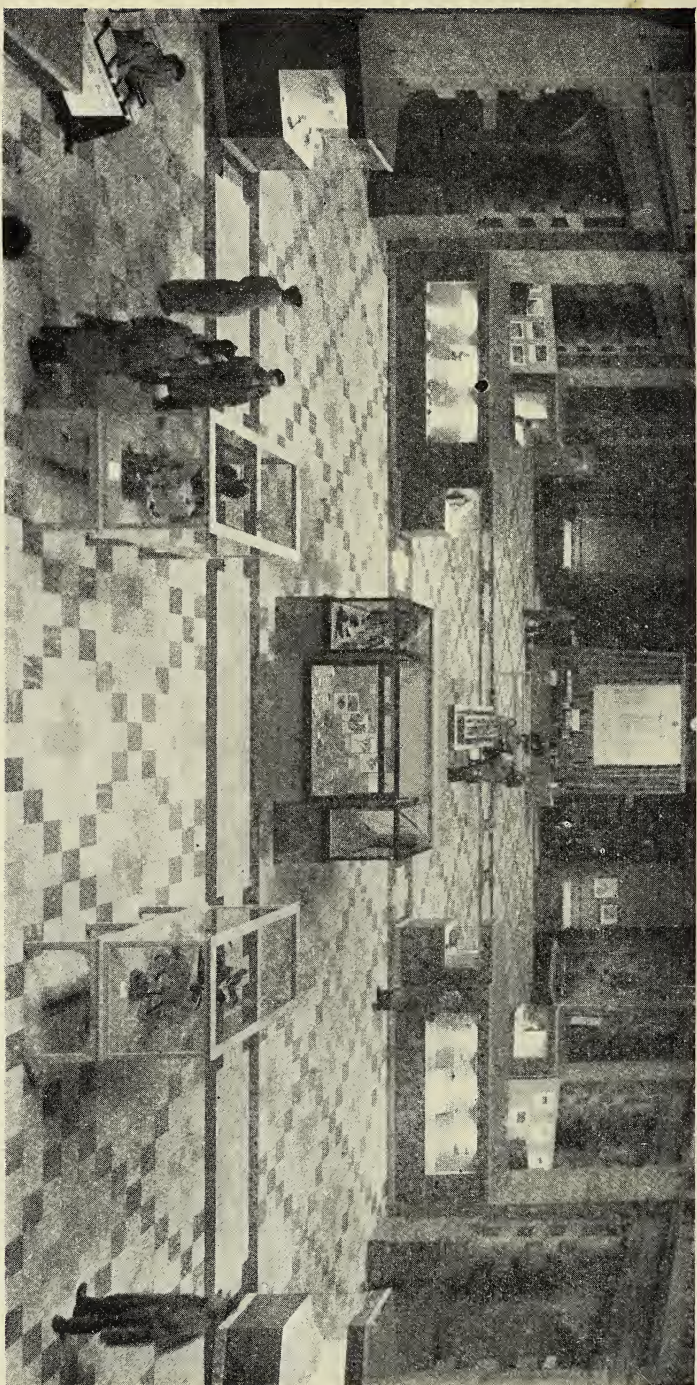
35 Wild Fruits

36 Friends of the Farmer

37 Foes of the Farmer

38 Plants of the Seashore

39 Life of the Seashore



A GENERAL VIEW OF THE EXHIBITION



and Sandra Graham, Mrs. Palmar, Dr. Patton, Messrs. Graham, Ribbons, Nicol, McKechnie and Holloway.

Four evening film shows, featuring many aspects of Natural History were given to the public. There was an attendance of 100-120 people at each show. The programmes were as follows :—

Sept. 5 —Birds and Man  
Volcanoes in Action  
Sunny Tribe  
Life Story of Frog.

*Chairman*—Wm. J. Cannon.

" 12—Some Birds of the Countryside  
Ants  
Creatures of Rocky Pool  
Gift of the Green

*Chairman*—Dr. Donald Patton.

" 19—Story of Trout  
Plants  
The Warblers  
Glow-worm

*Chairman*—James Graham.

" 26—Kruger National Park, South Africa  
Emperor Moth  
Water Folk  
Badgers

*Chairman*—Thomas Robertson.

An opportunity for questioning was given after each film, and the lively discussions indicated the interest and appreciation of the audience.

Now that it is all a thing of the past, the committee is still unanimous that our success would not have been possible without the whole-hearted co-operation which we received from Dr. Henderson and his staff and that the vast amount of voluntary work accomplished was amply rewarded by the interest and enthusiasm aroused.



# ANCIENT VOLCANOES OF WESTERN SCOTLAND

By B. C. King, D.Sc., F.R.S.E., F.G.S.

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*(Summary of Lecture delivered 9th April, 1951)*

The idea of volcanic activity is virtually identified with the idea of a conical volcanic mountain. However, vulcanism can in fact give rise to quite a variety of land forms, while the recognition of vulcanicity in the past must depend on other characteristics, since the typical volcanic cones rarely survive erosion.

The extruded products are lavas and fragmental materials, the relative abundance of the latter depending on the explosive character of the eruption, which in turn is related to the composition of lava at source. The volcanic products erupted from a central vent give rise to typical volcanoes of cone or dome shape, basic lavas forming large low angle "shield" volcanoes (Hawaii), acid lavas giving small steep domes (Auvergne), while ashes and intermittent lavas produce the familiar "composite" cones (Vesuvius, Etna). In the past, however, enormously greater volumes of basic lavas have been extruded from linear vents or fissures. Such are the Tertiary flood basalts of the Deccan Plateau of India and the Hebridean area of Western Scotland. Great thicknesses of lavas of this kind are commonly preserved from complete removal by erosion, whereas the familiar volcanic cones disappear. All that remains to indicate the presence of former volcanoes of central type are the sub-structures, such as volcanic plugs or necks.

The study of such sub-structures is of importance in throwing light on the mechanics of vulcanism and the mode of formation of the volcanic products and in this respect the study of the remains of the Tertiary volcanoes of the western sea-board of Scotland is particularly valuable, since here are displayed volcanic sub-structures at different relative levels of erosion.

The Tertiary volcanic history of Western Scotland falls into three main episodes: 1, Regional; 2, Local (central); 3, Regional. The earlier regional episode was characterised by the flood basalts, of which a maximum of 6,000 ft. is preserved in Mull, now represented by a number of dissected relics (Skeve, Rum, Mull, Ardnamurchan, Morven). The final

regional episode was marked by dyke swarms, the majority of which conform to a NNW-SSE trend.

The episode of central eruption is the most interesting. In a number of districts, the flood basalts are penetrated by complexes of igneous rocks related to well-defined foci. These have been the objects of intensive study, commencing with the work of Harker in Skye (published in 1904). Unlike the flood basalts and later dykes the volcanic rocks associated with these centres show great variety of composition and include both acid and basic members. These rocks form characteristic concentric patterns—ring dykes and cone-sheets—a feature which became especially apparent in the later work in Mull and Ardnamurchan.

Interpretation of these central complexes as volcanic sub-structures emphasised in particular two points of analogy with recent volcanoes. The first of these is the migration of the centre of eruption during the period of activity, building up a ridge shaped volcano such as Mt. Hekla, or a complex shield, such as Mauna Loa. In similar fashion the ring patterns of the earlier foci of Mull and Ardnamurchan are partly obliterated by those of later foci. In the second place the mode of emplacement of the ring dykes was regarded as explained by analogy with central subsidence such as appears to have been responsible for the giant craters or calderas of Crater Lake, Oregon, Lake Toba, Sumatra and many other present day or recently extinct volcanoes.

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## TERRITORY IN ANTS

By M. V. Brian, M.A., F.R.E.S.

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*Summary of Lecture delivered 14th May, 1951*

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Four species of ants may be considered—*Myrmica rubra* and *Myrmica scabrinodis* (both red ants), *Formica fusca* (a black ant), and *Leptothorax acervorum* (a brown ant). Since the ant is a tropical creature, the places chosen by queen ants for the foundation of a colony are well-drained sunny spots, for example, under a stone on a sunny hillside; here the soil beneath the stone is excavated, and the warmth of the sun's rays upon the stone and the moist air underneath provide for

much of the time the conditions of a tropical rain forest : rates of growth are the same in this country as in warmer climates. Tree stumps which are beginning to decay are often colonised by ants, but when further rotted these are often demolished by mammals such as rabbits and roe-deer. The encroachment of bracken and of heather causes so much shade that the ground is no longer warm enough for ants, thus many unused galleries of former ants' nests are found in peat. Competition takes place between the different species for desirable nesting sites, for example a tree stump may form an island of moist warm conditions surrounded by a layer of peaty material, outside of which may occur the wet soil inhabited by moles and earthworms, with the associated moisture-loving plants. Where black ants are present, they always occupy the spot having a southern exposure with the red species in possession of the west and north, but if the black species is absent, the red ants choose the warmest place. The black ants drive out the reds, but in the absence of black ants, competition develops between the two red species and after a time *M. scabrinodis* drives out *M. rubra*. Colonies of ants have definite tracks leading from the nest to trees where they farm the aphids ; the ants collect honey-dew, a substance secreted by the aphids, and in return give them a measure of protection. The track from any one nest does not cross that from another colony, though the colony is not always in the middle of a territory, the reason being that ants tend to forage in the direction in which they meet with no opposition. Ants are also carnivorous, and may be seen foraging in human footprints for damaged insects. Territorial rights are strongest in relation to nesting sites and collection of honey-dew—the ants will hunt without regard to territory.

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Plaster nests containing colonies of ants and the larvae of the small fruit fly, *Drosophila*, were exhibited ; the lecture was illustrated with slides.



## THE ISLE OF MAY BIRD OBSERVATORY

By M. F. M. Meiklejohn, M.A.

*Summary of Lecture delivered 9th October, 1951)*

The island is admirably situated for a bird observatory, rising as it does from the North Sea, five and a half miles from the coast of Fife and fifteen from the Bass Rock. It is a mile long, and the abrupt cliffs on the western side slope gradually down to the sea on the opposite side of the island. *Armeria maritima* grows everywhere and peat is being formed from the decaying plants; two other plants of the island are *Sedum anglicum* and *Asplenium marinum*. Fires are common in the summer time and it is noticeable that *Sedum anglicum* is the first plant to colonise the resulting bare patches.

The mammals associated with the May are the common and grey seals, rabbits (of which many are coloured black and white), and the house mouse; a few goats provide an irregular milk supply. There are no sheep now, but their presence there in the seventeenth century was noted by the poet William Drummond of Hawthornden.

Still to be seen are the remains of a priory built by King David I., in memory of Saint Adrian who was martyred by the Danes. The Priory was handed over to Benedictine Monks of Reading and one wonders how the monks relished having to travel so far from home. Pieces of pottery and flooring tiles belonging to the Middle Ages have been found, some of them turned up by the excavations of the rabbits. There was once a village at the southern end of the island, but of this there are only a few remnants: the island is now inhabited by the lighthouse people and the ornithologists.

The earliest lighthouse on the May was erected in the seventeenth century by King James VI. and I. and is still to be seen; it was a primitive affair consisting of a building on the top of which a bonfire could be made.

Pioneers of bird-watching in this part of the country were Miss Baxter and Miss Rintoul, who have recorded many observations, among them two very rare species, the pied wheatear and the Siberian stonechat. The island is an important one for bird-watching, although it does not harbour so many species as the Fair Isle, the rare birds arriving having generally been blown off their course.

The Observatory was founded four years before the war by the Midlothian Ornithologists' Club; it is now administered by the Scottish Universities Bird Observatory Committee,



though the actual running of the Observatory is still in the hands of Edinburgh ornithologists. It was formerly necessary for birds to be shot in order to be identified, but happily this method is now, with a few exceptions, a thing of the past and identification is carried out in the field. This has been made easier by improved techniques in field identification and in trapping.

There are three Heligoland traps, each consisting of a large wire-netting tunnel which tapers and curves gradually to a collecting box at the end in which the birds are caught. The wide mouth of the tunnel is planted with elders, *Rosa rubiginosa*, *Rosa spinosissima*, small pine trees, tree mallows and hops. In one case a small pond was constructed within the tunnel, and tangles of barbed wire placed near are attractive to birds seeking shelter. Some species of birds are easier to trap than others; garden warblers cause no trouble, they trap themselves. The wren, however, is a very wary bird: pipits and wheatears are reluctant to enter a Heligoland trap and for these small baited traps are used instead.

Wet weather with a South-east wind drives the birds to the island. A water rail was caught roosting on a window-sill; a blackcap, too weak to fly was picked up; tired goldcrests will even alight on people. But these birds soon recover their vitality if placed in a warm dry place. Occasionally, in misty weather, with an east wind, there is danger of the birds flying against the beacon light and being killed.

In addition to the migratory birds, there is a number of cliff-breeders, including kittiwakes, guillemots and fulmars; carrion crows, starlings and rock pipits, blackbirds and pied wagtails, but the house sparrow is extinct. Herring gulls have increased in an alarming manner in recent years: in 1936 fifty pairs were recorded, there are now over three thousand gulls and as they are a menace to the terns and other breeding birds, their number ought to be kept down; this might be done by shaking the eggs to prevent hatching.

For the bird watcher, the day is long: to see as much as possible of migration, it is advisable to rise at dawn; at six o'clock the air is full of birds, by eight o'clock they may all be gone. There is keen excitement in watching the birds spiralling down out of the clouds and this excitement grows intense when a rare bird is caught sight of: a black-headed bunting trapped recently was but the fifth record for Scotland; another rarity, a grey-headed wagtail, was trapped after a great deal of strategic planning. The birds are first trapped and ringed, coloured rings being used for resident birds. It is important to measure the birds, since the size varies so much within the same species; birds are also weighed to ascertain

how long they have been without food, those coming in on an east wind being often lighter than those arriving from the west. The ectoparasites found are collected and sent for identification to the Royal Scottish Museum. Later in the day a census is taken and the evening is usually devoted to writing up the census schedules and the log book. Birds are often ringed on the island at night-time; Mr. Dougal Andrew once fitted rings on fifty gulls in two hours by flash-light. Bird migration goes on by day and night; geese may be seen passing up the Forth by day.

It is often necessary to hold a bird in the hand for complete identification, especially when determining the age and sex; for example, to tell whether a wheatear is a female or an immature male, it is necessary to ascertain the colour of the mouth. Only when a bird is in the hand can the exquisite colouring be fully appreciated. There is no cruelty involved in the trapping of migrants: on the contrary, the enforced rest is sometimes beneficial to tired travellers.

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The lecture was illustrated by lantern slides showing the conformation of the island, the modern lighthouse and the cottage used by visiting ornithologists; the Heligoland traps. One of the traps is called the "Bain" trap, named after its builder, Mr. John Bain, a retired member of the Lighthouse Service.

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## THE ISLES OF SCILLY

By B. W. Ribbons, B.Sc., A.L.S.

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(Notes from Lecture delivered 13th November, 1951)

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The Isles of Scilly are numerous flat-topped masses of granite lying 28 miles to the South-west of the Land's End. Five are inhabited and more are habitable.

The Gardens of Tresco Abbey were begun inside shelter belts of holm oak, *Cupressus macrocarpa* and *Pinus radiata*, in 1834 by the then Lord Proprietor; his present successor continues actively to maintain them. Many plants from Australia, New Zealand and South Africa are grown and the effect has been described as an open-air edition of the temperate house at Kew magnified four or five times. There are over fifty species of *Mesembryanthemum*, hedges of fuchsia, aloes, cordylines, great eucalyptus trees, yucca-like beschornérias and the finest outdoor collection of acacias in Britain.

Echiums having spikes some twenty feet high, have come from the Canary Islands and Madeira and there are various palms, cacti and other exotic plants.

Of the western isles, with their sharp inhospitable rocks, St. Agnes, with its ancient lighthouse is typical. The following are noteworthy plant records :—*Acanthus mollis*, now seen for the first time since 1851 ; *Datura stramonium*, the thorn apple, which was first seen in 1948 and again in 1950 ; the minute *Centunculus minimus*, also first seen in 1948. The scrambling South African *Senecio mikanioides* is established in two places in the island. In general the Scillonian flora resembles that of the Channel Islands in both the native and introduced species.

Many lichens, seaweeds and birds are found. Among the last are puffins and Manx shearwaters, both menaced by the greater black-backed gulls. In the uninhabited " bird island " of Annet is a remarkable carpet-like armerietum composed of two feet thick cushions of the thrift.

The lecturer spoke also of the life of the Scillonian people and of the richness of the traditions and legends associated with the islands. Many lantern slides, both in monochrome and in colour, demonstrated the features described and showed especially the plants of Tresco Gardens and the wonderful Mediterranean-like colours of the Scillies.

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## AN INTRODUCTION TO SPIDERS

By James Graham

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(Summary of Lecture delivered 13th November, 1951)

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Of the Arachnida, or Spiders, there are 565 species in Britain ; these live on insects, which are first killed, then chewed to extract fluid. They are classified according to the manner in which they hunt for food :—web-weavers, wolf spiders, jumping spiders, crab spiders, trap door spiders.

**Web-weavers.**—*Ciniflo* : webs are found on palings, doors, window ledges, under stones and on bark of trees ; sometimes in cellars and sheds ; the web is like a little bit of blue matting.

*Theridion* : webs are built in bushes and under hedges ; each consists of a number of threads, stretched here and there, crossing each other in all directions.

*Linyphia* : webs are found in shrubs, among bracken, sometimes in hedges ; the web is a conspicuous hammock, a



misty cloud, anchored by threads stretching above and below ; the spider waits above this.

*Agelena* : a " sheet " web is laid out on gorse bushes, brambles or ditches ; there is a funnel-shaped hole in it ; this is found in the South of England.

*Aranea* : webs are formed in the orb, or cart wheel pattern, set perpendicularly, or slant-wise.

*Aranea diadema*, the garden spider, is 0·5 inches in length, a warm brown colour, with white markings on the back—one of these is in the form of a cross. The silk web is made from fluid secreted by the spider, and extruded by one or more of six spinnerets ; this fluid solidifies in air. The thread is pushed out, sails in the wind, held by the second pair of legs until it meets with an obstruction ; the spider appears to feel for this, having poor sight. A square is first made, divided into two, then the spider works from the centre, to the boundaries, making the " spokes." Three or four roughly made, widely spaced spirals are then formed—these are scaffolding. The spider carefully lays another spiral in between each two existing spirals, attaching the thread to each spoke, and smearing it with a sticky fluid ; to make sure that each strand is taut, the scaffolding is held by the first three pairs of legs, the strand just laid is held by one leg of the fourth pair, and " twanged " by the other, to make sure that it is tight enough. As this real snare is laid, the scaffolding is rolled up and tossed away. A long line connects the centre to some retreat where the spider lies in wait for the first victim. If this first victim damages the web, a complete new one is made.

**Wolf-spiders.**—These do not build webs : they depend on keen sight and fleet foot. They may live for one or two years. Small ones shelter under stones or in crevices—older ones build shafts into the earth, and expand these as they grow older. The prey is killed immediately.

**Jumping spiders.**—These stalk their prey ; they operate on walls, palings and plants. The commonest of these is the Zebra spider, which is black with broad, white, transverse markings ; it is found often in greenhouses ; it has a pad of adhesive hairs, called a scopula, between the claws and is able, therefore, to walk up the side of a glass jar. In this group, the Salticidae, four of the eight eyes are placed in front of the head instead of on top, so that these spiders have good vision. The spider may " jump " on a dead insect, but immediately turns away from it.



**Crab-spiders.**—These have a crab-like motion—they move sideways, or even backwards. The colour changes to suit the surroundings—white, pink or green—the change may take place in 24 hours or take 20 days. One of these, a black and white one, imitates the droppings of a bird by weaving an irregular rounded blotch on a leaf and remaining at the centre of this ; by this means it may remain unconcealed and watch for prey. Many crab-spiders work on the ground amongst fallen leaves, others on flowers to suit their own colouration. One, *Thomisus Onustus*, preys on bees. It remains hidden in a flower until this is visited by a bee which it bites in the neck, killing it. The spider then sucks the fluid from the bee, throws the remains over and waits for another. *Micrommata virescens*, the most beautiful spider in Britain, is one of this group—the female is a glowing green colour that really looks fluorescent, the male is of the same green colour, but the back is bright yellow marked with vivid scarlet streaks. Female crab-spiders spin strong cocoons in which the young develop, and from these they have to be dug out by the parent ; insects venturing near are chased away as possible enemies, and are not used as food. The cocoons are watched for about six weeks ; during this time the spider does not eat and when the young hatch out it usually dies.

**Trap-door Spiders** (*Mygalomorphae*). Only one of this group is found in Britain and it does not make a trap-door. The spiders come out at night, make a web, which they roll up in the morning and take back to the nest. They have downward pointing fangs which strike pick-axe fashion. The British species, *Atypus affinus*, is 0.5 inches in length ; it builds a tube like the others of this group ; this is roughly 12 in. in depth, with a wall round it 3 in. above ground ; the inside is lined with fine silk. The protruding part is camouflaged with bits of surrounding vegetation or soil on top of a layer of silk. The spider waits underneath until an insect touches the outside, when it strikes through the silk and camouflage, drags its prey inside and kills it. The tube made by the male is smaller than that of the female. At the end of the summer the male leaves its tube in search of the tube of a female, in which it tears a hole and enters. It is usually killed by the female after a few months. Eggs are laid the following summer, the young remaining in the tube for about six months. Gossamer threads flying in the air are made by young spiders off to make nests of their own.

Spiders have many enemies—ichneumon flies, solitary wasps, ants, toads, frogs and birds ; because of this only two per cent reach maturity.

# THE ASSOCIATION OF FUNGI WITH BRYOPHYTES

By S. Williams, PH.D., D.Sc., F.R.S.E.

(Summary of Lecture delivered 11th December, 1951)

A large number of Bryophytes, possibly the majority, have fungal associates. In a very few examples, e.g. *Tilletia sphagni* in the capsules of *Sphagnum* species, the fungus is parasitic. The majority of the associations appear to be casual and without physiological significance, but there are many examples where there is a condition clearly comparable with those associations of fungi with the roots of higher plants which are known as mycorrhiza.

Examples of this latter condition are seen in *Marchantia*, *Lunularia*, *Preissia* and in *Pellia*. The fungus here is very similar to that present in the mycorrhiza of the Angiosperms (apart from the Orchids). The mycelium is non-septate; it enters the rhizoids and invades the tissues of the thallus where, in some of the cells, the fungus is digested. In leafy liverworts, such as species of *Calypogeia*, *Lophozia* and *Diplophyllum*, the hyphae are confined to the rhizoids and send special suctorial haustoria into the neighbouring cells of the stems.

An entirely different type of fungus is associated with the larger species of *Aneura*. It is probably a *Rhizoctonia* and is remarkably similar to the fungus in the mycorrhiza of the orchids. It occurs as coils of hyphae in the cells of the thallus. In some cells, the septate hyphae remain healthy but, in others, a process of digestion results in the break-down of the fungus.

There is no clear evidence that the presence of the fungus in the above examples is of benefit to the liverwort. It seems possible, however, that the fungus breaks down some of the humus in the substratum and then absorbs the carbohydrates and amino-acids so formed. On digestion of the fungus by the cells of the liverwort, the latter would gain some of these substances at second-hand and thus supplement its food supplies.

The most outstanding example of a "mycorrhizal" association in the Bryophytes is given by the completely saprophytic *Cryptothallus mirabilis* v. Malmb., a genus closely allied to *Aneura* but totally devoid of chlorophyll. *Cryptothallus* has been recorded from Cardross and Rowardennan in Scotland and, more recently, from a number of English localities. In this liverwort there is a condition very similar to that seen in orchids devoid of chlorophyll such as *Neottia*. The nutrition of these complete saprophytes is still not understood but, in the absence of chlorophyll from the higher plant, it seems likely that the fungus plays a vital role in the process.

# LIST OF FIRST ARRIVALS OF SUMMER BIRDS IN CLYDE AREA IN 1951. COMPILED FROM REPORTS OF MEMBERS AND FRIENDS

BY THOMAS ROBERTSON

| <i>Bird</i>                  | <i>Date</i> | <i>Locality</i>        | <i>Average<br/>Date over<br/>57 years</i> | <i>Earliest<br/>Date,<br/>1950</i> |
|------------------------------|-------------|------------------------|---|------------------------------------|
| Lesser Black-<br>Backed Gull | Jan. 7      | Helensburgh            | Mar. 11                                   | Jan. 15                            |
|                              | Jan. 16     | Stevenston             |   |                                    |
|                              | Mar. 7      | Richmond Park, Glasgow |   |                                    |
| Wheatear                     | Mar. 31     | Southend, Kintyre      | Mar. 25                                   | Mar. 24                            |
|                              | April 1     | Helensburgh            |   |                                    |
|                              | April 8     | Fairlie                |   |                                    |
|                              | April 8     | Kilmarnock             |   |                                    |
| Chiffchaff                   | April 9     | Southend, Kintyre      | April 8                                   | Mar. 26                            |
|                              | April 21    | Kilmarnock             |   |                                    |
|                              | April 22    | Largs                  |   |                                    |
| White Wagtail                | April 9     | Richmond Park, Glasgow | April 4                                   | April 18                           |
|                              | April 20    | Stevenston             |   |                                    |
|                              | April 28    | Hamilton               |   |                                    |
|                              | April 28    | Largs                  |   |                                    |
| Swallow                      | April 10    | Kilwinning             | April 10                                  | April 5                            |
|                              | April 15    | Lochwinnoch            |   |                                    |
|                              | April 18    | Kilmarnock             |   |                                    |
|                              | April 18    | West Kilbride          |   |                                    |
| Sand Martin                  | April 14    | Dumbarton              | April 9                                   | Mar. 26                            |
|                              | April 18    | Drymen                 |   |                                    |
|                              | April 18    | Southend, Kintyre      |   |                                    |
| Common<br>Whitethroat        | April 17    | West Kilbride          | May 1                                     | April 14                           |
|                              | April 25    | South Bute             |   |                                    |
|                              | May 3       | Dalry                  |   |                                    |
| Terns (Common<br>and Arctic) | April 18    | Seamill                | May 8                                     | April 22                           |
|                              | May 1       | Rhu                    |   |                                    |
|                              | May 1       | Southend, Kintyre      |   |                                    |
| Willow Wren                  | April 18    | Southend, Kintyre      | April 12                                  | Mar. 27                            |
|                              | April 21    | Cardross               |   |                                    |
|                              | April 21    | Carmunnock             |   |                                    |
|                              | April 21    | Kilmarnock             |   |                                    |
|                              | April 21    | Lochwinnoch            |   |                                    |
|                              | April 21    | Lugton                 |   |                                    |
| Cuckoo                       | April 19    | Stevenston             | April 22                                  | April 27                           |
|                              | April 21    | Southend, Kintyre      |   |                                    |
|                              | April 23    | Dalry                  |   |                                    |



| <i>Bird</i>                    | <i>Date</i>  | <i>Locality</i>   | <i>Average<br/>Date over<br/>57 years</i> | <i>Earliest<br/>Date,<br/>1950</i> |
|--------------------------------|--|---|---|------------------------------------|
| <b>Common<br/>Sandpiper</b>    | April 20<br>April 21<br>April 22<br>April 22<br>April 22 | Loch Thom<br>Hamilton<br>Balgray Dam<br>Darvel<br>Helensburgh | April 13                                  | April 8                            |
| <b>House Martin</b>            | April 21<br>April 30                                     | Dalry<br>Largs  | April 25                                  | April 14                           |
| <b>Redstart</b>                | April 21<br>April 22<br>April 24                         | Drymen<br>West Kilbride<br>Southend, Kintyre                  | April 26                                  | May 6                              |
| <b>Whinchat</b>                | April 21<br>April 30<br>May 2                            | Kilmarnock<br>Southend, Kintyre<br>Helensburgh                | April 28                                  | April 12                           |
| <b>Sedge Warbler</b>           | April 27<br>April 28<br>May 6                            | Kilmarnock<br>Lochwinnoch<br>Dalry                            | May 2                                     | May 3                              |
| <b>Corncrake</b>               | April 28<br>May 7<br>May 13                              | Dalry<br>Kilmarnock<br>Southend, Kintyre                      | April 25                                  | May 3                              |
| <b>Tree Pipit</b>              | April 28<br>May 5<br>May 12                              | Darnley Glen<br>Inversnaid<br>Coulport                        | April 23                                  | May 3                              |
| <b>Swift</b>                   | May 2<br>May 3<br>May 3                                  | Linn Park, Glasgow<br>Dalry<br>Largs                          | May 2                                     | May 4                              |
| <b>Grasshopper<br/>Warbler</b> | May 3  | Drymen  | May 5                                     | May 4                              |
| <b>Yellow Wagtail</b>          | May 5<br>May 7   | Motherwell<br>Kilmarnock                                      | April 21                                  | April 29                           |
| <b>Wood Wren</b>               | May 5<br>May 12  | Inversnaid<br>Coulport  | May 3                                     | May 7                              |
| <b>Garden Warbler</b>          | May 17<br>May 18   | Netherlee<br>Largs  | May 9                                     | May 10                             |
| <b>Spotted<br/>Flycatcher</b>  | May 17<br>May 19<br>May 20                               | Netherlee<br>Southend, Kintyre<br>Arran                       | May 11                                    | May 13                             |
| <b>Blackcap</b>                | —  | No Report   | May 11                                    | May 6                              |
| <b>Pied Flycatcher</b>         | May 24   | Richmond Park, Glasgow  | —   | —                                  |



## NEW RECORDS.

In the course of work on the freshwater molluscs of the West of Scotland, W. Russell Hunter established the following new records for Dunbartonshire (Vice-county 99) :—

*Dreissena polymorpha*—The Zebra Mussel, at many points on the Forth and Clyde Canal.

*Bithynia tentaculata*—The Greater Bithynian Snail, at many points on the Forth and Clyde Canal between Old Kilpatrick and Bowling, also in St. Germaines Loch, Bearsden.

*Limnaea auricularia*—The Ear Pond Snail, at a few points on the Forth and Clyde Canal, east of Old Kilpatrick.

These records were communicated to the Conchological Society and specimens were verified by the Recorder. They are included in the new Census of the Distribution of British Non-marine Mollusca. (1951, *J. Conch.*, 23, pp. 171-244.)

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### The Miller's Thumb—*Cottus gobio* Linn.

Recorded in British Association Handbook, 1901, for—

- (1) Upper Kelvin and tributaries.
- (2) Carmel Water, Ayrshire.
- (3) Dobbs Burn, near Paisley.

Now recorded by Dr. Patton, from the Earn Water (tributary of River Cart), in stream above bridge at Muirshields Farm House, Loganswell, on 4th September, 1951.

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### The Grey Squirrel

Seen at Glenorchard, Balmore, Torrance, by Mr. Rennie, on 15th June, 1951 : this is believed to be an extension of its range eastwards.

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### *Homogyne alpina* (L.) Cass.

Recorded from the parish of Cortachy and Clova, Angus, by Mr. A. A. P. Slack in August, 1951.

This is an alpine plant of the Continent and was first reported for the Clova Mountains by George Don. In the vegetative state the plant is rather like the dwarfed, high-altitude condition of its ally, *Tussilago Farfara*, and this may account for its remaining undiscovered during the gap of a century and a half between the two records. (Specimens in fruit were exhibited.)

## SOME RECORDS OF CLYDESDALE FUNGI

By R. H. Johnstone, M.A.

In continuation of the records published in 1946, Vol. XV., Part 2, p. 59, of *The Glasgow Naturalist*, a further list of species is given hereunder. None of these is recorded in The British Association Handbook 1901 Fauna and Flora of the Clyde Area, or in The Clyde Card Catalogue.

| NAME.                                      | LOCALITY        | DATE.    |
|--|-----------------|----------|
| * <i>Cortinarius scandens</i> Fr. ...      | Balloch ...     | 11/10/51 |
| <i>Cortinarius causticus</i> Fr. ...       | Linn Park ...   | 7/10/44  |
| * <i>Cortinarius rubicundulus</i> (Rea)    |                 |          |
| Pearson ... ..                             | Glenorchard ... | 3/10/47  |
| * <i>Cortinarius obtusus</i> Fr. ...       | Craigallion ... | 8/10/51  |
| * <i>Inocybe umbrina</i> Bres. ...         | Dougalston ...  | 22/10/49 |
| * <i>Inocybe petiginosa</i> (Fr.) Gillet   | Hareshawmuir    | 15/10/45 |
| * <i>Hypholoma Candolleianum</i> Fr.       | Cadzow ...      | 31/10/42 |
| * <i>Clitocybe vibecina</i> Fr. ... / ...  | Cadder ...      | 26/10/40 |
| * <i>Hygrophorus agathosmus</i> Fr. ...    | Hareshawmuir    | 15/10/45 |
| * <i>Mycena hiemalis</i> (Osbeck) Fr.      | Mains Wood ...  | 18/10/47 |
| * <i>Mycena cinerella</i> Karst. ...       | Linn Park ...   | 9/10/47  |
| * <i>Nolanea icterina</i> Fr. ... ..       | Glenarbuck ...  | 12/10/40 |
| * <i>Russula sanguinea</i> (Bull.) Fr....  | Cadzow ...      | 15/10/46 |
| * <i>Russula versicolor</i> J. Schaeffer   | Dougalston ...  | 4/7/45   |
| <i>Russula xerampelina</i> Fr. ...         | Cadzow ...      | 21/9/48  |
| <i>Panus torulosus</i> (Pers.) Fr. ...     | Cadder ...      | 29/8/42  |
| * <i>Porphyrellus porphyrosporus</i> (Fr.) |                 |          |
| Gilb. ... ..                               | Cadzow ...      | 29/9/49  |
| * <i>Boletus calopus</i> Fr. ... ..        | Craigallion ... | 8/10/51  |

\* These specimens have been submitted to Mr. A. A. Pearson, F.L.S., of the British Mycological Society who kindly supplied or confirmed the identification.

In the British Association Handbook 1901 there appears a record *Agaricus* (*Hypholoma*) *appendiculatus*. This almost certainly refers to the species now known as *Hypholoma Candolleianum*. It is not really known to what the Friesian *Ag. appendiculatus* refers, and the agaric to which the name was usually given in Britain is now established as *H. Candolleianum* Fr. (see Transactions of The British Mycological Society Vol. XXXI, page 183).

*Clitocybe vibecina* is another common agaric which has probably been wrongly confused in the past with *C. brumalis* which may account for its omission from local records.

*Panus torulosus* appears in the 1901 Handbook as *P. conchatus*, a name which has now been abandoned.

## SECRETARY'S REPORT

The Year 1951 will stand out in the annals of the Society as the Centenary Year. The success of the month of events could not have been attained but for the co-operation of that large body of active members of the Society under the excellent leadership of our President, Professor K. W. Braid. It is gratifying to record the addition of eighty-one members during the year, bringing the membership to 282, the highest since 1945. The Centenary Celebrations played an important part in this addition. There are five Honorary Members, one Corresponding Member, and seven Life Members.

We have to record during the year the death of four of our esteemed members, Mrs. Peter Ewing, Miss Agnes Meikle, Mr. J. Duncan Leslie and Mr. Archibald Shanks.

The outstanding feature of the Society continues to be the field meetings and the increased attendances have been encouraging.—JEAN C. D. CRAIG.

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## REPORT OF DELEGATE TO THE CONFERENCE OF THE CORRESPONDING SOCIETIES OF THE BRITISH ASSOCIATION

Accompanied by five members of our Society, I attended the Meeting of the British Association for the Advancement of Science which was held this year in Edinburgh from 8th to 15th August. The meeting was an outstanding success, both from its setting against such a historic background, and from its having for President H.R.H. The Duke of Edinburgh ; the latter factor, I believe, being responsible for the record attendance of 4,012.

The Conference of Delegates of Corresponding Societies was attended by thirty-five representatives. On Thursday, 9th August, we met in the University to hear Dr. Douglas Allan, Director of the Royal Scottish Museum, deliver his Presidential Address on "The Scottish Scene." This was an interesting historical survey of our country, commencing with geology, then through the colonisation of flora and fauna to the arrival and spread of man. Thereafter the speaker detailed the museums and the ways in which they portrayed the Scottish Scene indoors. Turning to the countryside he then surveyed our National Parks, Nature Reserves, Biological Stations and other similar institutions brought into being to counteract the damage done by man to the Scottish Scene, and ended his address on an optimistic note.



The next speaker was Dr. W. E. Swinton, who addressed us on "The Scottish Tradition in Natural Science." This was a summary of the history of these sciences and of Scots who influenced, or were influenced by, them.

Thereafter we went to the Royal Scottish Museum where we were taken to the workshops and given excellent demonstrations of the skill of the taxidermist, as well as that of the renovator of old works of art.

On Friday, 10th August, we had an excursion to the Zoological Gardens where, among other things, was seen an electric eel discharging electricity which lit a number of small bulbs. Of further interest was the almost human appearance of a chimpanzee as it puffed away at a cigarette, even bringing the smoke down its nostrils. We were also privileged to enter the Penguin Enclosure and see these strange birds at close quarters.

On Monday, 12th August, a Conference Lunch was held, with, as guests, the Chairman of the National Trust for Scotland (The Earl of Wemyss and March), and the Principal of Edinburgh University (Sir Edward Appleton). There followed a visit to the Seaweed Research Station at Musselburgh, after which we were taken on a conducted tour of Loretto School.

It was a most interesting and enjoyable week and I wish to thank you for appointing me your Delegate.—JOHN BOYD.

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## NOTES FROM THE SOCIETY EXCURSION REPORTS

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HEADS OF AYR, 26TH MARCH, 1951—*Leader*, MR. JOHN BOYD.

Nine members took part in this excursion: it was a dull morning, commencing with drizzle and ending in a blizzard of sleet.

At Belleisle, amongst the more unusual shrubs, the male catkins of *Garrya elliptica* were noted. At Doonfoot, a swan was observed in the act of nest building; out at sea among the gulls several tufted duck were swimming. Among the plants noted were scurvy grass, whitlow grass, yew, butcher's broom, thale cress. What was more remarkable in the vegetative world was its general backwardness—no celandine, dog's mercury, or coltsfoot in flower, though plants were abundant.

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ROMAN WALL, 7TH APRIL, 1951—*Leader*, MR. JAMES KIRKWOOD.

The excursion took place in showery weather and the route proposed had to be shortened. The original intention



was to traverse that part of the Antonine Wall which stretched from Twechar to Dullatur.

The Antonine Wall crossed Scotland at its narrowest part, from Carriden on the Forth to Old Kilpatrick on the Clyde. It was not built of stone, but probably of clay and earth in the eastern portion as far as Falkirk and of turves on a foundation of stone in the western portion from Falkirk to the Clyde. In the front it had a protecting ditch and behind a military way. At intervals of two miles along its entire length were stations or forts to hold the garrison—19 forts in all. The Roman Wall traversing Scotland from sea to sea passes through many picturesque stretches of scenery, and it is in the more elevated parts of the countryside, far from encroaching buildings, that its remains are best preserved. These remains consist largely of parts of the ditch, of the military way, and of fort sites. The route Twechar to Dullatur traverses the wall at its highest elevation.

Arriving at Twechar the excursion party followed the ditch to the Barrhill, 475 feet above sea level, and the site of the highest situated fort on the wall. Here a short paper on the Antonine Wall was read by the leader, and after inspecting the wall and other visible remains, the party followed the ditch as far as Overcroy, where the excursion had to be abandoned on account of extremely heavy rain.

The authoritative book on The Roman Wall in Scotland is the book bearing this title, by Sir George Macdonald (2nd Edition, 1934).

MILLPORT AND MARINE BIOLOGICAL STATION, 2ND JUNE, 1951  
—*Leader*, Mr. RICHARD PRASHER.

Seven members attended.

Mr. Powell, the algologist, showed the party over the buildings including the research and stock rooms, library, museum and aquarium. On the rocky shore the party was introduced to the flora and fauna of the upper tidal zone.

LOUDOUN CASTLE, 4TH AUGUST, 1951—*Leader*, Mr. PRASHER.

Eleven members were present.

Of special interest here is the fine old yew tree, situated near the south wall of the Castle, under which it is said that the articles of union between Scotland and England were signed by Lord Hugh Campbell.

The following plants were noted :—Greater Celandine, *Chelidonium majus*, growing in the hedge near Loudoun Kirk ; round leaved dock, or Monk's Rhubarb, *Rumex alpinus*, near the Castle ; thyme-leaved sandwort, *Arenaria serpyllifolia* ; yellow goat's beard, *Tragopogon pratense* ; broad-leaved helleborine, *Epipactis latifolia*.

## Sectional Reports

### BOTANICAL SECTION (Convener, Mr. Prasher)

Fourteen excursions were arranged and all but two carried out. The evening outing to Tollcross, after half an hour during which many interesting plants were observed, had to be abandoned owing to heavy rain; at Kilmacolm, threatening conditions led to the members altering the programme and spending the time in an examination of the interesting marshlands on the hillside to the north of the village. There was an average attendance of nine members.

The following specimens were considered most noteworthy:—At Blae Loch : *Dicranum Bonjeani*, *Climacium dendroides*. At Possil Marsh : *Stellaria glauca*, in fine condition and considerable abundance.

In addition to the sectional excursions arranged by the committee, it should also be noted that members of this section took a prominent part in the special outings in connection with the centenary celebrations, and in supplying specimens for the exhibition.

### ENTOMOLOGICAL SECTION (Convener, Mr. Lothian)

The excursions were held jointly with the Botanical Section.

Early moths such as the Marsh, *Hydrilla palustris*, and Dotted Border, *Hybernia marginaria*, appeared at usual times; but with the spell of bad weather at the time of the Sallow catkins, these gave poor returns. The common types were found, but were few in number.

The first Small White butterfly, *Pieris rapae*, was observed on 10th May and the first Small Tortoiseshell, *Vanessa urticae*, on 23rd April—both about one month later than usual. Green Hairstreaks, *Callophrys rubi*, appeared about 30th<sup>1</sup> May—the usual time—in their restricted locality and were quite plentiful. Later butterflies were very scarce: only odd specimens of Peacock, *Vanessa io*, Red Admiral, *Pyrameis atalanta*, and Small Copper, *Chrysophanus phlaeas*, were seen.

A female Elephant Hawk moth, *Chaerocampa (Eumorpha) elpenor*, was taken at dusk on 29th June at a gilliflower (or stock) in the garden by Mr. Maclaurin: this was the **first record** of the species in Renfrewshire. A fully grown caterpillar of the same moth was later handed in, taken in Paisley; this had been too long in a box and died.

A butterfly which appears to be increasing in the district is the Small Pearl-bordered Fritillary, *Argynnis selene*. It was plentiful this year.

In October, the caterpillars of the Fox Moth, *Macrothylacia rubi*, appeared quite commonly after being scarce or absent from the district for three or four years.

The state of the spring buds indicated that the November and winter moths had appeared as usual,

Outside the district, the Small Mountain Ringlet butterfly *Erebia epiphron*, was again observed and the caterpillars of the Small Chocolate-tip moth, *Pygaera pigra* were found by Mr. Maclaurin for the first time ; they were feeding on Sallow.

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## ORNITHOLOGICAL SECTION

(Convener, Mr. Robertson)

The Section had a field programme of ten excursions. The first outing of the season provided the most spectacular sight : on the ground beside the Clyde at Hamilton, hundreds of duck were seen ; the principal species was wigeon, but mallards also were numerous. On a second visit three weeks later, only a small fraction of the previous number was there. The species of water fowl noted were :—Pintail, pochard, wigeon, shoveler, mallard, teal, tufted duck, whooper swan, great crested grebe, little grebe, coot, waterhen, heron. The number of separate species recorded on all the excursions was 85.

The summer migrants were on the whole a week or two behind the normal arrival time.

Two interesting species continue to extend their breeding range :—The common buzzard is definitely invading the "Lowland" counties of Renfrew, Ayr and Lanark, and may become as well known as the carrion crow in the areas round Glasgow, where no game preservation is carried on. The pied flycatcher seems to be advancing steadily northwards ; two birds were reported among the summer migrants arriving in 1951, one on 6th May in the Irvine Valley and one in Richmond Park, on 24th May.

A late date for geese was 4th May, when a flock of 48, probably grey lag or pinkfoot, passed over Gartocharn on their way north.

The Arctic Skua was seen at Ardeer on 28th May.

A surprising report was of a pair of tawny pipits at Richmond Park on 17th May as this Eastern European species is a most uncommon visitor to Scotland.

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## GEOLOGICAL SECTION (Convener, Mr. Cannon)

The Sectional meetings were reduced to five in 1951, due to the fact that some of the members were fully engaged in preparation for the Centenary Exhibition.



Fossils from Brockley and fossils from the Collection of John Smith were distributed among the members on two occasions and papers on the Kilpatrick's and "Natural History in Criminal Investigation" were read before a large body of members.

Messrs. Ramsay and Cannon gave a joint demonstration of fluorescence in minerals. Mr. Ramsay's specimens literally dazzled the members by the wonderful colours they displayed under ultra-violet radiation, while Mr. Cannon demonstrated local minerals and spoke on practical applications of this phenomenon.

The Section held eight excursions during the summer, the first four being well attended, while later in the season the attendance was affected by unfavourable weather conditions. Two of these excursions deserve further mention, particularly that to Murroch Glen on 12th May, when a vein of Celestine (Strontium sulphate) was discovered—a record for this district.

The vein was found between the fourth dyke and the cement stones on the west bank of the burn, associated with Gypsum, Dolomite and Aragonite. The mineral was probably deposited from solution in a crack caused by the shrinkage of the dyke in cooling, and this deduction was supported by the presence of Gypsum. The mineral was analysed chemically and spectrographically.

During the excursion to Ballaghan Glen in June, a large bed of Stigmairian rootlets was discovered and two specimens of Calamite stems. These were the first fossils found in this locality by members of the Society within the last fifteen years, and there is no mention of any such discovery in the Transactions.

Year after year the Section visits these two Glens and year after year members are unfailingly astonished and thrilled by new discoveries or what one might call revelations. The destructive power of wind and water is nowhere more clearly demonstrated, particularly in the upper reaches of Murroch Glen. Indeed, if a visit is made in September, followed by another in April, it is difficult to realise that it is the same place, so many changes have been wrought by denudation.

At the Centenary Exhibition, sixty-seven mineral and ore specimens on display were the property of members, and for those interested in archaeology, palaeontology, and palaeobotany there were separate special displays. These facts indicate the healthy condition of the Section, and this is further demonstrated by the presence at the last two Sectional meetings of seventeen and eighteen members respectively, while the number on the roll has been increased to twenty-nine.



## DIGEST OF THE PROCEEDINGS OF THE SOCIETY

SESSION XXI—1951

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JAMES ANDERSON.

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MABEL G. SCOTT, M.A., B.Sc., 29 Shawhill Road, S.1.

*Editor of Transactions—*

ERNEST STOLLERY, 51 Allison Street, S.2.

MABEL G. SCOTT, M.A., B.Sc., 29 Shawhill Road, S.1.

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*Delegate to the Conference of the Corresponding Societies of the British Association—*

JOHN BOYD.

*British Association Committee—*

WILLIAM RENNIE, Convener, the President, Vice-Presidents, Hon. Secretaries, Librarians, Delegate, the Conveners of the Sectional Committees.

*Representative to the Committee of the Scottish Marine Biological Association—*

J. WEIR.

*Representatives to Scottish Field Studies Association Council—*

Dr. J. INGLIS CAMERON.

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ED. J. A. STEWART, M.A., B.Sc.

*Auditors—*

CHARLES D. MACFARLANE.

JAMES R. WOOD, C.A.

## SOCIETY MEETINGS

16TH JANUARY, 1951.

Professor Braid, President, occupied the chair.

The following new members were admitted:—Miss Diana Lewis, B.A., B.Sc., Agricultural College, 6 Blythswood Square, C.2; Mr. Robert T. Givien, 673 Pollokshaws Road, S.1; Mr. Allan Stirling, 17 Austen Road, Jordanhill, W.3.

Mr. Boyd's report of the excursion to Millport was read by Mr. Prasher; Dr. Patton read his report of the excursion to Dumbarton; Professor Braid read his report of the excursion to Killiecrankie.

The annual exhibition of the Photographical Section was presented. Miss Craig contributed slides of Snowdonia and Orkney and of the West of Scotland—mainly geological—and also some taken at the excursion to Ballantrae. Dr. Isobel Case showed many botanical slides, including some very fine pictures of orchids. Mr. Prasher showed an interesting bird photograph which was taken by Mr. Shanks. Professor Braid showed some pictures of flowering plants and of the excursion to Ballantrae.

6TH FEBRUARY, 1951.

Professor Braid presided at the Annual Business Meeting.

Mr. David L. H. Patton, 15 Jordanhill Drive, W.3, was admitted to membership.

The reports of the Society's activities were read and approved.

Mr. James Anderson was appointed Vice-President in place of Dr. Patton; Mrs. Glen, Dr. Patton, Mr. Ribbons were appointed members of Council; Mr. C. Eric Palmar was appointed Convener of the Photographical Section in succession to Mr. Anderson; Miss Mabel G. Scott was appointed Librarian in place of Mr. Robert Hodge, who had resigned on account of ill-health; Mr. J. Duncan Leslie was appointed Representative to the Council of the Scottish Field Studies Association in place of Mr. Thomas Robertson. The remaining office-bearers were re-elected. The retiring members of Council were co-opted for the Centenary Committee.

13TH MARCH, 1951.

Professor Braid presided.

The following new members were admitted:—Miss Elaine McKendrick, 379 St. Vincent Street, C.3; Mr. Neil D. Cleat, B.Sc., Department of Genetics, The University, Glasgow; Mr. James T. Forrest, Little Udston, Hamilton; Mr. J. A. Gibson, 39 Strathmore Avenue, Ralston, Paisley; Dr. Alexander R. Hill, B.Sc., Ph.D., F.R.E.S., Kinnaird Cottage, 30a Drymen Road, Bearsden; Mr. David A. Muir, 76 Dumbuck Crescent, Dumbarton; Mr. George D. Scott, Maclay Hall, 17 Park Terrace, C.3; Mr. David Wilkie, B.Sc., Barnscroft, Carriagehill Drive, Paisley.

Mr. John Weir was appointed Convener of the Zoological Section.

Mr. E. Ford, D.I.C., F.R.S.E., Director of the Marine Biological Station, Millport, delivered a lecture on "The Importance of the Individual."

9TH APRIL, 1951.

Professor Braid presided.

Mr. Boyd read his report of the Society excursion to Ayr.

Five new members were admitted:—Miss Ruth M. Badcock, B.Sc., M.Sc., Department of Zoology, The University, Glasgow; Miss E. A.

Campbell, Dalsersf Schoolhouse, Larkhall; Mr. R. A. Crowson, B.Sc., A.R.C.S., D.I.C., 6 Belmont Street, W.2; Mr. A. Kennedy, 77 Castle-milk Crescent, S.4; Mr. John Morgan, 17 George Crescent, Clydebank.

Dr. Basil C. King delivered a lecture on "Ancient Volcanoes of Western Scotland" (p. 36). He illustrated this with screen projections and line drawings.

14TH MAY, 1951.

Professor Braid presided.

Mr. Lee exhibited a specimen of *Draba muralis* found on 12th May between Inverkip and Wemyss Bay.

Mr. M. V. Brian delivered a lecture on "Territory in Ants" (p. 37).

11TH JUNE, 1951.

Professor Braid presided.

Five new members were admitted:—Miss Beth Macfarlane, Porterswell, Uddingston; Mr. Walter G. Bailey, B.Sc., F.R.I.C. and Mrs. Jean Sinclair Bailey, M.A., B.Sc., Ferndean, Garngaber Avenue, Lenzie; Dr. K. N. G. MacLeay, B.Sc., Ph.D., F.L.S., Department of Botany, Gordon Memorial College, Khartoum, Anglo-Egyptian Sudan; Mr. Richard Templeton, 73 High Street, Rutherglen.

Mr. Prasher read an obituary notice on the death of Mr. Shanks (p. 63).

Mr. Thomas Robertson submitted a list of the first arrivals of Summer Birds in the Clyde Area in 1951 compiled by members and friends (p. 46).

The Annual Exhibition of Botanical, Geological, Entomological, Microscopical Sections was held. Mr. Cannon showed specimens of Calcium compounds that were fluorescent; also a piece of Celestine (Strontium sulphate) found in Murroch Glen on 12th May.

Mr. Hunter intimated new records of fresh-water molluscs in the Clyde Area (p. 48).

9TH OCTOBER, 1951.

Professor Braid presided.

Thirty-eight new members were admitted:—Mr. Samuel Adams, 8 Range Place, Motherwell; Mr. Nicholas Aitken, 9 Levenbank Terrace, Jamestown; Mrs. Margaret Anderson, 19 Havelock Street, W.1; Miss Margaret I. Balabanian, M.A., 24 Riverside Road, S.3; Miss Frances M. Black, 15 Onslow Drive, E.1; Miss Elizabeth R. Brock, M.A., 15 Victoria Street, Dumbarton; Miss Janet F. Bowie, B.Sc., 9 Barterholm Road, Paisley; Dr. William Blair, 66 Chamberlain Road, W.3; Mrs. Boyle, 41 Allanton Avenue, Ralston, Paisley; Dr. David Reid Brown, M.B., Ch.B., D.P.H., 73 Carmyle Avenue, E.2; Mr. David Cameron, B.Sc., 4 Colinton Place, Springboig; Miss A. J. Campbell, 1010 Argyle Street, C.3; Miss Grace Cullen, 166 Old Castle Road, S.4; Mr. Robert Ewing Fisher, 366 Clarkston Road, S.4; Mr. James Gordon, 135 Finlay Drive, E.1; Mr. David Gray, M.A., c/o Mrs. Reid, 244 West Princes Street, C.4; Mr. Maurice Greenberg, 34 Kingshurst Avenue, S.4; Mr. C. A. Hopping, B.Sc., 33 Cassels Street, Carlisle; Dr. S. A. Hutchinson, T.D., B.Sc., Ph.D., Department of Botany, The University, Glasgow; Miss Marion M. Izatt, B.Sc., 44 Menock Rd., S.4;



Miss Jessie F. Logan, 11 Stirling Drive, Bearsden; Mrs. Catherine Dow Maxwell, 31 Garthland Drive, E.1; Mr. William Melville, 17 Dunard Road, Rutherglen; Mr. Murdo Murray, B.Sc., 50 Swainbost Ness, Stornoway; Mr. Alexander McAllister, M.A., c/o Mrs. McCuaig, 41 Ashley Street, C.3; Mr. William MacCallum, 11 Ravenscraig Terrace, S.W.3; Miss Muriel McCulloch, 6 Springboig Road, E.2; Mr. Henry J. G. McGhie, M.A., 18 Newton Street, C.2; Mr. J. A. McLennan, B.Sc., 34 Hawthorn Walk, Cambuslang; Mrs. Sarah Rankin, 9 Naseby Avenue, W.1; Miss Elizabeth M. Robertson, Broompark, 36 Ayr Road, Whitecraigs; Mr. William K. Skinner, 60 Otago Street, W.2; Mr. David L. Smith, Dalquhurn Cottage, Renton; Mr. John Taylor, 26 Glentyan Avenue, Kilbarchan; Mr. Vladimir Vand, 21 South Mains Road, Milngavie; Mr. Robert M. Wark, 60 Vicarfield Street, W.1; Miss Edith W. Wilson, 2 Springfield Crescent, Bishopbriggs.

Dr. Patton exhibited a specimen of the Bull's Head, or Miller's Thumb—a new record in the West of Scotland (p. 48).

A collection of Fungi was shown by Mr. Johnstone and coloured sands from Alum Bay, Isle of Wight, by Miss Craig.

Professor M. F. M. Meiklejohn delivered a lecture on the Isle of May Bird Observatory (p. 39); he showed photographs of the island and the Observatory.

### 13TH NOVEMBER, 1951.

Professor Braid presided.

Fourteen new members were admitted:—Mr. Thomas Blyth, 40 Kinnell Avenue, S.W.2; Mr. Joseph Donnelly, B.Sc., 18 Cumbernauld Road, Muirhead, Chryston; Miss Ruth J. Ferrie, Endrick House, Drymen Station; Miss Helen Finlay, M.A., 261 Churchill Drive, W.1; Mr. Joseph T. MacConnell, 160 Gartocher Road, E.2; Mr. Charles McCrostie, 25 Ashcroft Drive, S.4; Mr. George MacKay, 94 Burnside Street, C.4; Mr. James S. Muir, 66 Kilmorie Drive, Bankhead, Rutherglen; Miss Isabel H. Neilson, 117 Dunbeth Road, Coatbridge; Miss Margaret M. C. Prentice, M.A., 263 Churchill Drive, W.1; Miss A. L. C. Robertson, Broomage House, Larbert; Miss Catherine O. Ross, 38 Rannoch Drive, Bearsden; Mr. Edgar W. Struthers, 56 Aitken Street, E.1; Mr. Cecil P. Taylor, 96 Bowman Street, S.2.

Mr. Lee read an obituary notice of Mrs. Ewing (p. 62); Mr. Gordon read one of Mr. J. Duncan Leslie (p. 60).

Mr. Skinner displayed some geological and botanical specimens.

Maps, charts and plans of the Garth House Field Studies Centre were shown by Dr. Cameron.

Mr. Basil W. Ribbons, B.Sc., A.L.S., delivered an illustrated address on the Isles of Scilly (p. 41); this was followed by a lecture entitled "An Introduction to Spiders" by Mr. James Graham (p. 42).

### 11TH DECEMBER, 1951.

Five new members were admitted:—Mr. John Anderson, 19 Have-lock Street, W.1; Miss Christine O. Dawson, B.Sc., 180 Riverford Road, S.3; Mr. David J. Martin, B.Sc., 175 Curzon Street, N.W.; Mr. D. G. Moulton, 3 Queen's Terrace, Ayr; Mr. Frank L. Sinclair, M.A., 12 Arlington Street, C.3.

Mr. Prasher read his report of the excursion to Millport.

Specimens were exhibited by Mr. Ribbons and Mr. Skinner.

Dr. S. Williams, Ph.D., D.Sc., F.R.S.E., delivered a lecture on "Plant Associations of Fungi and Bryophytes" (p. 45).



## OBITUARIES

### AGNES ADAM MEIKLE

Miss Meikle died in Edinburgh on 8th February, 1951, after only a few weeks of acute illness. She had been engaged for a year and a half in the Zoological Department of the Royal Scottish Museum, arranging and describing an educational display, mainly of Insects affecting Man and his Industries. Her colleagues have spoken most highly of the value of her work in the Museum and have expressed their deep sense of personal loss in her early death.

Her scientific training began in the West of Scotland Agricultural College, where she gained the National Diplomas in Agriculture and Dairying, and she followed these with a course at the the Training College in Edinburgh, which qualified her as a teacher of Rural Science.

Her practical experience was obtained by service on farms of various types and she was eventually appointed Farm Manager at the Ladies' Horticultural College at Swanley in Kent. The physical strain of this work, often single-handed, proved too much for her health and she came back to join the staff of the College in Glasgow as Assistant in the Zoology Department. In this she served with enthusiasm and efficiency for some fourteen years, taking part in the teaching, advisory and experimental work, in all of which her wide experience was of great value. By a special effort of private study she added to her qualifications the Degree of B.Sc.Agric.(Lond.).

Miss Meikle's special interest came to be the study of insects affecting agriculture in all its branches, and she moved on to the zoological laboratory of Glasgow University, with a post-graduate research scholarship, for special work on the biology of Leaf-miner Flies (*Trypetidae*). In Edinburgh, she was still engaged upon the records of her observations and she left drawings and notes which it is hoped may be of use to other workers.

She was well-known as an active supporter of our own and other societies devoted to field studies in Natural History. She had a genius for friendship, a constant readiness to help and a fund of good humour which made her welcome everywhere.

—L. A. L. KING.

### JOHN DUNCAN LESLIE

By the passing of Mr. John Duncan Leslie on 16th October, 1951, our Society loses another of its oldest members. Mr. Leslie joined the Microscopical Society in the year 1900 and was Honorary Secretary from 1907 to 1920, in which year he joined the Natural History Society. Since the amalgamation, he held various offices including that of President. At the time

of his death he was a representative to the Scottish Field Studies Association and a member of the Entomological Committee.

Mr. Leslie commenced to take an interest in *Lepidoptera* at quite an early age ; he visited the Entomologist's Mecca, The New Forest, in the year 1900 with the late John E. Murphy and used to recall the fine time they had there meeting many well known Entomologists.

Later his interest turned more particularly to *Coleoptera* and this remained with him to the time of his death. About two years ago he had two operations, separated by a fortnight. He survived these, but did not fully recover. Notwithstanding the fact that he was suffering intermittent pain and great weakness, his interest and enthusiasm could not be quelled. He went out with a shooting stick and a sweeping net and by using the shooting stick to sit on would sweep the vegetation within reach, then move a few yards and repeat until he was tired. Two days before going to hospital for a third operation and suffering almost continual pain, he finished setting some beetles and asked his sister to take them to me in Glasgow, remarking that there were some quite nice weevils among them, as indeed there were. Less than a week later he passed peacefully away.

Mr. Leslie must surely have been one of our best known members, having, until recently, been one of the most regular attenders at meetings and outings. It was during his term of office as President that this Society was so actively engaged in two matters of great importance to the future of Nature Study in this Country, namely the formation of the Field Studies Council and the Report to the Regional Planning Commission.

Of Mr. Leslie's many other interests I will mention only two : the Glasgow Choral Union in which he sang as a second Tenor and held a number of prominent positions including that of Vice-President ; and the Photographic Society in which he also held office ; on one occasion he secured their premier award, the Bronze Plaque.

A more versatile and generally well informed person it would have been hard to find, so many and varied were his interests. If he had one outstanding characteristic it was absolute dependability.

Dr. J. Inglis Cameron writes : " As Mr. J. Duncan Leslie's colleague on the Council of the Scottish Field Studies Association, I feel it my duty to add my tribute to his memory by recalling the great interest which he took in the popularisation of Natural History. His work in connection with the formation of the Council and his constant support of it thereafter will always be gratefully remembered by us all."

Mr. Leslie's wife died some years ago. They had no family. We extend our sincere sympathy to his two sisters who reside at West Horsley, Surrey.—THOMAS H. M. GORDON.

### Mrs. EWING

By the death of Mrs. Ewing on 26th July, 1951, at the ripe age of ninety years, we have lost one of our oldest, and for long one of our most active and well-known members. To the end, she retained her affectionate interest in the affairs and welfare of our Society; and although physical weakness prevented that regular attendance at our meetings and excursions which for a long time made her presence a feature of our gatherings, she kept in constant touch with us and was always available for that advice and consultation which, to many of us, was a valuable privilege. She will indeed be ever remembered as a loyal member and a respected friend.

Elizabeth Raymond Burden was born in Glasgow on 25th October, 1860. Her father, John Burden, was the proprietor of an ironmongery business in the city, and her early associations were always with the busy life of the city's centre. As a girl she assisted in the shop of James Young, of paraffin fame, and so may be said to have been connected from her youth with people of distinction. Besides being throughout her life a lover of the countryside and all the sights and sounds which we associate with wild nature, in spite of her urban origin, she was also keenly alive to the cultural value of the study of natural objects; and being at the same time possessed of strong literary tastes, she frequently contributed essays and articles to various journals, all of which were recognised as of the highest quality. Her style was of a particularly pleasing character; and many of us remember with delight the articles which appeared from time to time in the nature columns of our local newspapers. She also had the gift of expression in verse; and the occasional appearance of short poems from her pen was welcomed by all who could appreciate real poetry.

Her connection with our Society may be said to date from her joining the Andersonian Naturalists in the year 1888. In that happy company she quickly became prominent and took an active part in all its activities. From the start her interests were predominantly, though by no means exclusively, botanical and for some years she acted as Convener of the botanical section of that Society. In 1895 she joined the Natural History Society of Glasgow in which fellowship she soon became associated with many of the leading botanists of the day. In 1901 she married Mr. Peter Ewing, F.L.S., whose fame as a botanist was nation-wide; and until this happy union was sadly broken by Mr. Ewing's death in 1913 they worked



together to the great enrichment of our Society's annals. Immediately following this marriage, Mr. Ewing was elected President of the Society in 1902; and after his death the same honour was conferred on Mrs. Ewing in 1919. For many years Mrs. Ewing represented the Andersonian Society as Delegate to the British Association, and her reports of the proceedings of that august assembly were always listened to with the greatest interest, for she made it her business to follow carefully and report faithfully any matters of particular interest that arose in the discussions.

Mrs. Ewing is survived by her son, Mr. Raymond Ewing, one of our own life members, to whom we express our deepest sympathy in this bereavement.—JOHN R. LEE.

### ARCHIBALD SHANKS

The death took place on 1st May, 1951, of Mr. Archibald Shanks, at the age of eighty years and thereby our Society lost one of its oldest and most active members. He was born at Gourock in September, 1870; he was educated at St. James' School, Bridgeton, and in 1883 entered upon his career as an analytical chemist. In 1890 he went as chemist to Dalry; after 17 years he returned to Glasgow and lived at Greenhead. He often took a walk on the Green near the river and in the summer of 1913 saved a woman from drowning, for which he received a Carnegie Hero Award. After some years in the City, he started to work in Ayrshire, having obtained an appointment as chemist at the Glengarnock Iron and Steel Works; this appointment he retained until his retirement. About 1933 he purchased the house in Dalry where he resided until his death.

He was a man of alert and accurate observation and his acquaintance with Nature was the fruit of keen and loving intimacy with all her aspects and moods. He was widely read in all that was known and written about the things that so much interested him. During his residence in Glasgow he frequented the bookshops of the city and with the eye of a connoisseur selected and built up an interesting and valuable reference library of which eighty books on bee-keeping alone prove his great interest in this subject. His other activities included the recording of rainfall, photography and the mensuration of trees. His association with the late John Smith, the noted geologist and botanist of Ayrshire, led to his taking a special interest in the natural history of his county and it is safe to say that few men possessed a more intimate knowledge of its fauna and flora, its folklore and antiquities. He was a prominent member of the Geological Society of Glasgow from about 1897 and was latterly made an honorary member of that body.



He joined the Andersonian Naturalists' Society in 1894 and the Natural History Society of Glasgow in 1908. He took a prominent part in the work of these Societies, both in contributions to the monthly meetings and in field work. His observations of the bird life of Ayrshire and his frequent notes on the occurrences of particular species of animals and plants are eloquent of that keen enthusiasm that was characteristic of him. Particularly noteworthy was his discovery of the hoary ragwort *Senecio erucifolius* L. recorded in the Flora of the Clyde Area by John R. Lee.—RICHARD PRASHER.

### JAMES ROBERTSON JACK

James Robertson Jack, Emeritus Professor of the Department of Naval Architecture and Marine Engineering at the Massachusetts Institute of Technology, Cambridge, U.S.A., who died on 7th January, 1952, aged 86 years, was a life member of this Society. He joined the Andersonian Naturalists Society in 1902, and the Natural History Society of Glasgow in 1910. He was President of the former Society in 1913 and 1914.

Prior to his appointment in Massachusetts in 1919, he was for many years connected with the world-famous firm of ship-builders, Messrs. Denny of Dumbarton, as an expert designer; during the firm's special activities in naval construction throughout the First World War he held the post of Works Manager.

Notwithstanding the busy life imposed upon one so deeply engaged in an industry of such first-class importance, he found time to devote to other branches of scientific study connected with the world of natural objects and revelled in the activities of those whose leisure is directed to the observation of animals and plants in the field. His removal to America was felt as a loss, especially on excursions, which he regularly attended: but for several years thereafter he continued so to arrange his annual vacation as to be able to spend a few days each summer with his old friends of our Society. His interests were varied, and extended to more than one of the sections, but his special hobby was nature photography, and more particularly the portrayal of alpine plants. His visits to the mountains, more especially those of the Lawers range, were the source of many valuable contributions made to the Society's Transactions.

Professor Jack will ever be remembered by those who enjoyed the privilege of his personal friendship as a genial personality; frank and free in his nature, generous to a fault, and ever ready to appreciate and help the activities of his companions in the field. To the end he retained his affection for the Society in which he had spent so many of what he regarded as his happiest days; to many of us his memory will ever remain a fragrant one.—JOHN R. LEE.

505.41

December 3, 1952

# The Glasgow Naturalist

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including the  
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of the Society



**Vol. XVII.**  
**Part**  
**2**

1952



Edited by MABEL G. SCOTT, M.A., B.Sc.

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# CONTENTS

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## PAPERS—

|  | PAGES |
|--|-------|
| Additions to the Flora of the Clyde Area   |       |
| John R. Lee, M.A.      ...    ...    ...    ...    ...   | 65    |
| New plant records for the West of Scotland   |       |
| K. N. G. MacLeay, B.Sc., Ph.D., F.L.S.    ...    ...   | 82    |
| Further new and newly-confirmed records of the distribution<br>of fresh-water snails in the West of Scotland   |       |
| W. Russell Hunter, B.Sc., F.G.S.      ...    ...    ...  | 84    |
| A preliminary list of stoneflies (Plecoptera) from the Glasgow<br>Area   |       |
| Frank L. Sinclair, M.A. ...    ...    ...    ...    ...  | 89    |
| A note on the amphibious snail <i>Succinea pfeifferi</i> , Rossmässler,<br>in a previously undescribed habitat |       |
| W. Russell Hunter, B.Sc., F.G.S.      ...    ...    ...  | 91    |
| Note on the Great Spotted Woodpecker <i>Dendrocopus<br/>major</i> L.   |       |
| K. W. Braid, O.B.E., M.A., B.Sc., B.Sc.(Agric.), F.R.S.E.  | 92    |
| List of First Arrivals of Summer Birds in Clyde Area in<br>1952  |       |
| Compiled by Thomas Robertson      ...    ...    ...  | 93    |
| SOCIETY REPORTS      ...    ...    ...    ...    ...    ...  | 95    |
| EXCURSION REPORTS ...    ...    ...    ...    ...    ...   | 96    |
| SECTION REPORTS      ...    ...    ...    ...    ...    ...  | 100   |
| LIST OF OFFICE-BEARERS    ...    ...    ...    ...    ...    ...   | 102   |
| DIGEST OF THE PROCEEDINGS OF THE SOCIETY    ...    ...   | 103   |

## ERRATA.

### *Volume XVII, Part I.*

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Page 9, line 29. For "Kelvingrove," read "Kelvinside."

Page 10, line 23. For "The Scottish Society for the Protection of Wild Birds," read "The Scottish Wild Birds Sanctuaries' Trust."

Page 29, Cases 31 and 32. The Entomological Exhibit was mainly the work of Mr. Thomas H. M. Gordon, who supplied most of the insects and spent many hours arranging it. Mr. MacLaurin, Mr. Iain C. Crombie and Mr. Graham lent some of the Lepidoptera and assisted Mr. Gordon with the general arrangement.

Page 53, line 23. For "Early moths such as the Marsh, *Hydrilla palustris* . . ." read "Early moths such as the March, *Anisopteryx æscularia* . . ."

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### *Volume XVII, Part II.*

Pages 89-90—For "River Earn," read "Earn Water."

For "River Cart," read "White Cart Water."

For "Neilston Burn," read "Levern Water."



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## ADDITIONS TO THE FLORA OF THE CLYDE AREA \*

By JOHN R. LEE, M.A.

*(Delivered 9th December, 1952)*

Through the kind offices of an old friend, Mr. J. L. Colville of Dundee, I have recently been put in touch with two botanists, a lady and a gentleman, both resident in Cantyre, a district of the "Clyde Area" which, apart from the labours of such local workers—unfortunately seldom known to the world at large—has been neglected by observers in the field. It was with very great interest therefore that I was able to get from these friends during the past few months a considerable amount of fresh information, which has enabled me to fill up a large number of gaps in the records of plant species as given in the "Flora" published nearly twenty years ago. Not only so, but the observations of these workers, coupled with their having access to a very important and remarkably complete record of the work of former observers, unfortunately never published, has included a number of completely new additions to our local plant lists. I have, therefore, felt it incumbent upon me, as being responsible for having put together what at least professed to be at the time an up-to-date account of our local flora, to add the new information which has come to hand. I soon found, however, that in order to do justice to the subject, the work of other observers in the different sections of our area must also have a like recognition. I have, therefore, made out a list of plant species the occurrence of which in different sections of the area additional to those recorded in the "Flora" has now been reported.

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\* The Society is greatly indebted to the Royal Society for a substantial grant towards the publication of this paper.

It was, of course, inevitable that during the interval that has elapsed since the publication of the book many and varied changes should take place. Not only have there been additions, but there have been many changes in the status of the plant species; many formerly regarded as common have become rare and some may have disappeared, while others, formerly looked upon as rarities, have multiplied and become more or less common. With such changes I am not dealing in the present list, which only refers to plants which were not recorded for the different sections of our area distinguished in the "Flora" by the letters "A" to "J." There are in addition many new localities within each of these sections, but I am at present dealing only with those plants which have now been recorded from sections in which they were regarded in the book as absent. This is the case with regard to nine of the ten sections of the area lettered "A" to "J" as defined in the Introduction to the book. To facilitate reference it may be well here to repeat the definition of these sections:—

A—The parts of Ayrshire draining to the Clyde.

B—Renfrewshire.

C—Lanarkshire, including Glasgow.

D—The Kelvin drainage of Stirlingshire plus the detached portion of Dunbartonshire.

E—The Loch Lomond drainage of Stirlingshire.

F—The part of western Perthshire draining to Loch Lomond by the River Falloch. (There are so far no new additions in this section.)

G—Argyll, excluding Cantyre.

H—Dunbartonshire proper.

I—Buteshire.

J—The eastern part of Cantyre draining towards Loch Fyne and Kilbrannan Sound and divided from section G by the line of the Crinan Canal.

As regards the Cantyre district I have to thank my two correspondents for giving me much of the information contained in the old record already mentioned. This is a "List of Flowering Plants and Ferns of Kintyre," compiled by the late Mr. Latimer McInnes, which he deposited in typescript in the Public Library in Campbeltown in 1931 and kept regularly revised with further records of his own and other local workers until his death in 1946. This, with more recent additions by themselves, they placed in the hands of Dr. MacLeay who is at present engaged in what promises to be

an important and interesting work dealing with the Flora of Argyll; he has been able to verify many of the records and to add a number of his own. I am greatly indebted to Dr. MacLeay for having supplied me with the material he has thus acquired so far as it relates to the part of Cantyre which falls within the Clyde Area. The main difficulty in this connection has been to distinguish between records which are for localities coming within that area and those which refer to the western part of the peninsula draining to the Atlantic coast. This applies also to the large number of records by my other two correspondents, Miss Cunningham of Campbeltown and Mr. Fred. David, whose residence is at Cour Farm, situated about midway between Carradale and Skipness. These two, both enthusiastic field botanists, are thus sufficiently far apart to be able to furnish a fairly representative account of the flora along the whole eastern sea-board of Cantyre. All three friends have supplied me with the names of localities so as to verify the records as properly referring to our area.

Miss Cunningham's records are specially valuable as the district near Campbeltown is a somewhat critical one for two reasons. Many records appearing in Mr. McInnes' original list refer to places which have since his time been built over or otherwise destroyed so far as the plants are concerned, thus necessitating their omission from any up-to-date list. On the other hand, there are some parts in fairly close proximity to the town (which is situated on the east coast) having the drainage to the west: these Miss Cunningham has carefully excluded from the records which she communicated to me, and I cannot express too strongly my appreciation of the painstaking way in which her lists have been compiled.

Again I would like to express my deep indebtedness to Mr. David whose observations have resulted in a very considerable number of most interesting records, some of comparatively rare plants. He has similarly been at great pains to furnish localities for the various species. This excellent botanist has been a close and careful observer for many years, not only in Cantyre but formerly also in the vicinity of Ayr where, as a resident for some time, he added some plants to the list for Ayrshire. Some of these were not known to us until now; he has thus been able to supply "additions" to district "A" of the "Flora."

Besides the additions to district "J," I am also indebted to Dr. MacLeay for several items referring to other parts of Argyll coming under section "G." In this section there are



also several interesting additions by other friends to whom I am greatly indebted. I would like specially to acknowledge the assistance given by members of the Society. First of all I have made use of the important list compiled a few years ago of new records for the detached portion of Dunbartonshire, which appeared in *The Glasgow Naturalist*, vol. xv. p. 8. These appear in the present list, without further comment, as additions to "D." In other cases the names or initials of the various observers appear against the localities mentioned in the list, and amongst these friends I should like to mention three who have sent me lists of plants noted by them. I am specially indebted to Mr. Robert Mackechnie, B.Sc., A.L.S., who has given me notes of much careful work in various parts of the Clyde area since the publication of the "Flora," the results of which have added considerably to our local knowledge. From Mr. W. A. Scott, B.Sc., I have also received extensive lists of additional records, particularly in sections "C" and "G," many of which are of great interest as of plant species hitherto unrecorded for our area. Some of these have come in as "casuals" or been introduced into gardens but have now become so well established as to merit inclusion as additions to our flora. Similarly I have to acknowledge a number of interesting additions, especially in the Glasgow area (section "C"), from Mr. Iain C. Crombie, who has also given one or two important additions to the list for the Clyde Isles (section "I"). To these and others whose names or initials appear on the list I feel most grateful for their having enabled me to make this substantial addition to our local list of plants, which will, I trust, enable students of the Clyde flora to have a more complete knowledge of the information at present available.

Amongst the species now appearing for the first time in the Clyde list, there are a few upon which I should like to speak particularly. The most important "find" which is so announced is the discovery, apparently for the first time in Scotland, of the rare fern *Asplenium lanceolatum* Huds. by Miss Cunningham, verified by Dr. MacLeay and confirmed by the authorities at the British Museum. The story of its discovery is the subject of an interesting note in the present issue of this journal (p. 82) by Dr. MacLeay. Perhaps of almost equal interest is the recent discovery of *Rumex aquaticus* L. by Messrs. Lousley and Mackechnie on the banks of Loch Lomond. This very large dock has hitherto been supposed to be the same as our well-known *R. longifolius* DC., specimens of which occur at the same locality and were reported by Mr. Prasher quite recently; the two species are now understood

to be quite distinct, but the original plant *R. aquaticus* is apparently very rare in Britain.

A few species now appearing in the list have hitherto been regarded as strictly "garden" plants, and hence inadmissible as members of the flora proper. Such are *Euphorbia dulcis* L., *Cyclamen europæum* L., *Lysimachia punctata* L., *Pulmonaria officinalis* L., and *Gagea lutea* Ker. With the exception of the last, which has been well established at Largs for many years past, I have hesitated about the inclusion of such species; but Mr. Scott's careful observation of the ground near Lanark at which some of them occur has seemed to establish beyond a doubt that they have come to stay as permanent residents. In other cases their occurrence has become so frequent as to warrant their inclusion.

There are two plants which are recent arrivals in the British Isles; invaders, which appear to be spreading in many localities and have now arrived in the Clyde area. Definite records up to the present are now included in the present list and further "finds" are probable. They are *Arenaria balearica* L. and *Veronica filiformis* Sm., the former from the Mediterranean islands and the latter from the Caucasus. Both bid fair to become common in the near future, like the little willow-herb from New Zealand which has now become a feature of our countryside.

Some species of the difficult genus *Mentha* have recently had attention by specialists, and in the course of her observations Miss Cunningham has recorded the occurrence of a few of these in Cantyre, while Mr. Mackechnie and others have also obtained localities for some of them. Much probably remains to be cleared up regarding these forms and their status as species or hybrids, but the ones now included seem sufficiently distinct and permanent to enable us to regard them as worthy of inclusion.

In the case of "casuals" it is difficult to know how to draw the line as to whether they should be included in our lists. Generally speaking, it might be better to exclude them unless they can be definitely shown to be "established" or are so frequent as to have become familiar. There are, however, two occurrences of rare plants which I have included in this list although they have not been reported for some years as reappearing. These are the two species of *Galium* (bed-straws) recorded from Ayrshire by Mr. David. Their discovery seems to me of such outstanding importance that they merit exceptional treatment. Mr. David found them as long

ago as 1930 on the banks of the River Ayr, but he only submitted them in 1950 (on the advice of Miss Cunningham) to the Royal Botanic Gardens in Edinburgh for identification. At the time Mr. David supposed them to be the same and named them provisionally *Galium tricornae*. Professor Wright Smith was able to distinguish one of them as *Galium Vaillantii*, one of the "finds" of the maligned and now belatedly celebrated George Don, whose records have been the subject of much apparently unjust suspicion. The curious point about this case is that Don, in his original find in the Carse of Gowrie, made exactly the same error in identification as Mr. David, by calling his plant *Galium tricornae*, whereas it has since been verified as *Galium Vaillantii*. The second of Mr. David's specimens was, however, correctly named, and thus he has added two species new to our part of the country. The second is an undoubted British plant, occurring in the south, but uncommon, whereas *G. Vaillantii* is a Mediterranean species, adventive in this country; it has, however, occurred in several localities elsewhere in Britain, but is always regarded as rare. I believe there is a note somewhere in the Edinburgh Society's Transactions about Mr. David's discovery of these two plants, but I have not so far been able to trace the record.

In compiling the present list of additions I have followed strictly the arrangement and nomenclature adopted in the "Flora of the Clyde Area" with the solitary exception of the New Zealand species of willow-herb, the reason for changing which I explained at some length in a recent paper (*G.N.*, vol. xvi., pp. 70-73). My reason for keeping strictly to this, in spite of some recently revised "rules," is to facilitate reference by students who may want to make note of the changes involved. I have marked with an asterisk those species which are additions to the Clyde area since the "Flora" was published in 1933, and in each of such cases I have added a brief description for the sake of students in the field.

#### RANUNCULACEÆ

|                                 |                     |
|---------------------------------|---------------------|
| <i>Thalictrum alpinum</i> L.    | J.                  |
| <i>Ranunculus sceleratus</i> L. | J.                  |
| <i>R. bulbosus</i> L.           | J.                  |
| <i>R. hederaceus</i> L.         | J.                  |
| <i>Aconitum Napellus</i> L.     | I. Cumbræ (W.A.S.). |

#### PAPAVERACEÆ.

|                                    |                    |
|------------------------------------|--------------------|
| <i>Meconopsis cambrica</i> Vig. J. | Peninver (M.H.C.). |
|------------------------------------|--------------------|



## CRUCIFERÆ

- Nasturtium sylvestre* Br. A, D.  
*Cardamine amara* L. J.  
*Draba incana* L. G. Glen Fyne hills (Dr. MacLeay).  
*Subularia aquatica* L. G. Near Inveraray (Dr. MacLeay).  
*Lepidium Smithii* Hook. G, J. Inveraray (Dr. MacLeay); Southend, (Gemmell).

## RESEDACEÆ

- Reseda Luteola* L. J.  
*R. lutea* L. D.

## CARYOPHYLLACEÆ

\* *Dianthus deltoides* L.

The genus *Dianthus* is easily distinguished from the closely related *Silene* and *Lychnis* by the presence of two or more imbricating scale-like bracts embracing the calyx and by the single-chambered ovary with two styles. The present species is a slender plant with erect stems 6-12 in. high, solitary or tufted; leaves narrowly lanceolate, the lowest ones obtuse, slightly rough or downy; flowers usually solitary, rarely two together; bracts usually two; calyx with five teeth, minutely ciliate; petals rose-pink (rarely white).

C. Banks on dry sandy soil; rare. 6-9. Near Lanark (W.A.S.).

*Silene inflata* Sm. D.

*Lychnis vespertina* Sibth. J.

\* *Arenaria balearica* L.

A common garden escape, frequently found growing on old walls, etc. and apparently spreading. Easily recognised by its diffuse procumbent stems, minute leaves and solitary axillary flowers on slender peduncles with conspicuous white petals, about  $\frac{1}{4}$  in. diameter.

A-C, H, J. Rocks and walls; frequent. 5-8.

*Sagina apetala* L. J. Ardnacross Bay (Dr. MacLeay).

\* *S. ciliata* Fr.

Distinguished from *S. apetala* by the sepals always adpressed to the capsule, the two outer ones mucronate.

B. Rocks and walls; very rare. 6-9. Mearns (R. McK.).

*Sagina subulata* Presl. J. Cour (F. D.).

*S. nodosa* E. Mey. J.

*Spergularia salina* Presl. J.

*S. marginata* Kittel. J.



## PORTULACEÆ

- Claytonia sibirica L. D.  
C. perfoliata Don. H. Dumbarton.

## SCLERANTHACEÆ

- Scleranthus annuus L. J.

## CHENOPODIACEÆ

- Atriplex laciniata L. J.  
A. hastata L. J.  
Suæda maritima Dum. J.

## POLYGONACEÆ

- Polygonum cuspidatum Sieb. & Zucc. J.  
P. Bistorta L. J. Peninver (M.H.C.).

## \* Rumex aquaticus L.

The original plant of Linnaeus mentioned in the "Flora" as being synonymous with *R. longifolius* DC. has now been distinguished as a distinct species which has only been found in one or two places in this country. Though nearly related to *R. longifolius* it is a larger plant, with stems 6-7 feet, leaves broader at the base, slightly glaucous, a laxer perianth, the enlarged perianth segments narrowed to the apex.

E, H. Wet ground and margins of lakes; very rare. 7-8. Balmaha (R. McK.); Loch Lomond near Gartocharn (Lousley).

- Rumex longifolius DC. E. Balmaha (R. P.).  
R. sanguineus L. var. viridis Sibth. J.  
R. conglomeratus Murr. J.

## HYPERICACEÆ

- Hypericum dubium Leers. D.  
H. tetrapterum Fr. J.

## MALVACEÆ

- Malva moschata L. C, J. Thankerton (W.A.S.);  
Cour (F. D.).

## LINACEÆ

- Radiola Millegrana Sm. J.

## GERANIACEÆ

- Geranium dissectum L. J.

## BALSAMINACEÆ

*Impatiens Noli-metangere* L.

G, J. Kilmory (W.A.S.);  
Inverneill (M.H.C.).

*I. glandulifera* Royle.

A, B, I.

\* *I. Parviflora* DC.

A diffuse annual with erect peduncles bearing 3-10 very small flowers; lower sepal with a short, straight spur.

C. 7-11. An old garden weed, now apparently fully established at Cleghorn near Lanark (W.A.S.).

## EUPHORBIACEÆ

\* *Euphorbia dulcis* L.

Perennial. Stem 9-15 in., leaves alternate, oblanceolate, obtuse, sub-sessile, entire or serrulate near apex, nearly glabrous; bracts oval-deltoid, sub-acute, denticulate, truncate at base, green; glands green at first, turning purple, rounded and entire. Capsule warted.

C. 7-9. Cleghorn (W.A.S.).

## CALLITRICHACEÆ

*Callitriche hamulata* Kuetz.

J. Glenbreckerie (M.H.C.).

## URTICACEÆ

*Parietaria officinalis* L. I. Rothesay (H. A. Brown).

## CANNABINACEÆ

*Humulus Lupulus* L.

J.

## SALICACEÆ

*Populus nigra* L.

J.

*Salix Andersoniana* Sm.

J.

*S. repens* L.

J.

*S. viminalis* L.

J.

## LEGUMINOSÆ

*Medicago sativa* L.

J.

*Melilotus arvensis* Wallr.

J.

*Vicia lathyroides* L.

J.

*V. angustifolia* Sm.

J.

*V. sativa* L.

J. Skipness (F. D.).

*V. sylvatica* L.

J.

## ROSACEÆ

|                                     |                          |
|-------------------------------------|--------------------------|
| <i>Prunus avium</i> L.              | J.                       |
| <i>Potentilla procumbens</i> Sibth. | J.                       |
| <i>P. reptans</i> L.                | J.                       |
| <i>Agrimonia Eupatoria</i> L.       | J.                       |
| <i>Poterium canadense</i> Gray.     | A. Doonfoot (R. P.).     |
| <i>Rosa arvensis</i> Huds.          | C. Luggiebank (J. Jack). |
| <i>R. spinosissima</i> L.           | J.                       |
| <i>R. tomentosa</i> Sm.             | J.                       |
| <i>R. rubiginosa</i> L.             | J. Tarbert (F. D.).      |

## SAXIFRAGACEÆ

|                          |                       |
|--------------------------|-----------------------|
| <i>Saxifraga Geum</i> L. | J. Cour Burn (F. D.). |
| <i>S. aizoides</i> L.    | J.                    |

## RIBESACEÆ

|                          |       |
|--------------------------|-------|
| <i>Ribes nigrum</i> L.   | D, J. |
| <i>R. Grossularia</i> L. | J.    |

## DROSERACEÆ

|                              |                            |
|------------------------------|----------------------------|
| <i>Drosera anglica</i> Huds. | J. Cour, Crossaig (F. D.). |
|------------------------------|----------------------------|

## LYTHRACEÆ

|                          |  |
|--------------------------|--|
| <i>Peplis Portula</i> L. | J. Southend ; Crosshill<br>(M. H. C.). |
|--------------------------|--|

## HALORAGACEÆ

|                             |                        |
|-----------------------------|------------------------|
| <i>Hippuris vulgaris</i> L. | J. Cour shore (F. D.). |
|-----------------------------|------------------------|

## ONAGRACEÆ

|                              |                    |
|------------------------------|--------------------|
| <i>Epilobium pedunculare</i> | A. Cunn. A-D, G-J. |
| <i>E. obscurum</i> Schreb.   | J. Cour (F. D.).   |

## ELÆAGNACEÆ

|                                |                                  |
|--------------------------------|----------------------------------|
| <i>Hippophaë rhamnoides</i> L. | J. Carradale ; Saddell (M.H.C.). |
|--------------------------------|----------------------------------|

## UMBELLIFERÆ

|                                   |                      |
|-----------------------------------|----------------------|
| <i>Conium maculatum</i> L.        | J.                   |
| <i>Apium nodiflorum</i> Reichb.   | J.                   |
| <i>Chærophyllum temulentum</i> L. | J.                   |
| <i>Æthusa Cynapium</i> L.         | I. Arran (I. C. C.). |
| <i>Meum athamanticum</i> Jacq.    | D. Campsie (R. P.).  |

\* **Peucedanum sativum** Benth.

Annual or perennial. Stem 2-3 ft., angled and furrowed. Leaves large, pinnate; leaflets ovate-lanceolate, in 2-5 pairs, shining. Flowers yellow. Fruit with narrow wings. Easily known by its bright yellow flowers and simply pinnate leaves.

C, J. Waste places; rare. 7-8. Carmyle (I. C. C.); Campbeltown (M. H. C.).

\* **Heracleum Mantegazzianum** Somm. & Lev.

A gigantic herb, with stem 6-10 ft. high and about 2-3 in. diameter. Leaves 2-3 ft. long, pinnately divided. Umbel very large, rays numerous.

B, C, E. Waste ground and wood borders; rare. 6-7. Deaconsbank (R. McK.); Near Killearn (Dr. D. Patton); Banks of Cart and Kelvin.

### CAPRIFOLIACEÆ

**Symphoricarpus racemosus** Michx.

J. Cour Burn (F. D.).

### RUBIACEÆ

**Galium cruciatum** With. J.

**G. uliginosum** L. H, J.

**G. boreale** L. J. Carradale (F. D.).

\* **G. Vaillantii** DC.

Annual. In size and habit much resembling *G. Aparine*, but flowers smaller and more numerous, greenish. Fruit with hooked bristles but more hispid. Pedicels of fruit *straight, divaricate*.

A. Woods and river banks; very rare. 6-7. Banks of Ayr (F. D.).

\* **G. tricornis** Willd.

Annual. Somewhat resembling the last, but leaves narrower; fruit larger on *strongly recurved pedicels*, granulate.

A. Rare. 6-9. Banks of Ayr (F. D.).

**Sherardia arvensis** L. J. Southend; Peninver (M. H. C.).

### VALERIANACEÆ

**Valerianella olitoria** Moench. J.

### DIPSACEÆ

**Scabiosa arvensis** L. J.

### COMPOSITÆ

**Aster longifolius** Lam. D.

**Filago minima** Fr. J. Peninver; Saddell; Carradale (Dr. MacLeay).

**Inula Helenium** L. J. Sunadale (F. D.).



**Matricaria Chamomilla L. J.****\* Artemisia Absinthium L.**

Perennial ; strongly aromatic. Stems 1-3 ft., ascending. Leaves resembling those of *A. vulgaris* but silky on both sides ; segments oblong, obtuse. Heads larger, hemispheric, slightly drooping, silky, bright yellow, in panicle leafy racemes.

A. Waste ground near the sea, rare. 8-9. Largs (Dr. Cairnie).

**\* Ambrosia artemisiaefolia L.**

The genus *Ambrosia* is a curious group of annual herbs with monœcious flowers ; the male heads usually in loose racemes or spikes ; the female head consisting of a single flower enclosed in a cup-like involucre of sub-spinous bracts. The present species has erect, slightly 4-angled stems, clothed with adpressed hairs ; about 1-2 ft. high leaves mostly opposite, rather deeply bipinnatifid, dark green with adpressed hairs above, greyish-felted beneath. Female heads below the male, single or in clusters of 2-4.

A. Waste ground ; rare. 7-9. Low Green, Ayr. (R. P.)

**Petasites fragrans Presl.** A. Skelmorlie.

**Senecio viscosus L.** J. Killellan (M. H. C.).

**\* Carduus crispus L.**

Differs from *C. acanthoides* in having smaller and more numerous capitula crowded together in the panicle ; leaves narrower, downy beneath ; involucre bracts with more slender spines.

G. 6-8. Inveraray (Dr. MacLeay).

**Centaurea Cyanus L.** J. Smerby (M. H. C.).

**Hieracium boreale Fr.** J. Cour (F. D.).

**Leontodon hispidus L.** J. Carradale (F. D.).

**Lactuca muralis Fresen.** B, C. Rouken Glen ; Kilma-calm.

**\* Mulgedium Plumieri DC.**

The genus *Mulgedium* differs from *Lactuca* (with which it is sometimes included) in the sessile pappus and the larger blue (not yellow) flower-heads. This species is a rather coarse plant, with stems 1½-3 ft., erect and somewhat corymbosely branched ; radical leaves numerous, ovate, cordate at base with the auricles suddenly contracted to a longly winged petiole, the wings often at intervals expanded into small lobes, margin distantly dentate ; stem leaves usually sessile or amplexicaul. Margins of leaves and the petiole and veins beneath

sparingly hairy ; otherwise both surfaces glabrous. Capitula large ; flowers bright blue. Pappus pilose, sessile, white.

B, C, H. Waste places ; rare. 6-7. Near Paisley ; Tollcross ; Milngavie. A recent introduction or escape, apparently spreading.

### CAMPANULACEÆ

*Jasione montana* L. J.

### LOBELIACEÆ

*Lobelia Dortmanna* L. J. Cam Loch, above Ardris-haig (Dr. MacLeay).

### VACCINIACEÆ

*Vaccinium Vitis-Idæa* L. J. Cruach Breacan (Dr. MacLeay).

### PRIMULACEÆ

\* *Cyclamen europæum* L.

*Cyclamen* is easily recognised by the five broad, strongly reflexed corolla-lobes, giving the flower a curiously reversed appearance. The plants are herbaceous, with large tuberous rootstocks, radical leaves and erect naked one-flowered scapes. Flower nodding. Calyx-lobes 5 ; stamens 5, inserted on the base of the corolla tube.

C. Rare. 6-9. An introduction, but apparently well established at Cleghorn and at Braxfield, near Lanark (W. A. S.).

*Lysimachia thyrsoidea* L. D.

*L. vulgaris* L. J. Tarbert (M. H. C.).

\* *L. punctata* L.

Distinguished from *L. vulgaris*, which it much resembles, by the lobes of the calyx being without the reddish ciliate margin so conspicuous a character in that species.

C, I. 7-8. A frequent escape, but apparently spreading.

Waste ground near Glasgow (I. C. C.) ; Arran (R. McK.).

*Anagallis arvensis* L. J.

### GENTIANACEÆ

*Erythræa Centaurium* Pers. J.

*Gentiana campestris* L. J.

### BORAGINACEÆ

*Symphytum officinale* L. J.

*S. peregrinum* Ledeb. J.

*Mertensia maritima* Don. J.

\* *Pulmonaria officinalis* L.

The small genus *Pulmonaria* consists of a very few species of perennial herbs with creeping rootstocks, simple flowering stems 6-12 in. high, the flowers in terminal cymes. The present species is easily known by its ovate-cordate leaves always spotted with white and clothed with coarse hairs.

C, D. Hedges and woods ; rare. 5-6. Naturalised at Cleghorn (W. A. S.). Campsie.

\* *Myosotis collina* Hoffm.

This species, not uncommon elsewhere, has not hitherto been definitely recorded for the Clyde area. It closely resembles the well-known *M. versicolor* in size and habit, but with diverging pedicels, calyx open in fruit, and the corolla a bright unchanging blue.

J. Rocks and wall-tops. 4-7. Reported as frequent in Cantyre (M. H. C.).

### CONVOLVULACEÆ

*Convolvulus arvensis* L. D, J.

### SOLANACEÆ

*Solanum Dulcamara* L. C, J. Kilmun (Mrs. Edwards) ; Ardnacross (M. H. C.).

### SCROPHULARIACEÆ

*Verbascum nigrum* L. J. Inverneill (M. H. C.).

*Linaria vulgaris* Mill. J.

*L. repens* Ait. G. Ardrishaig (W. A. S.).

*L. Cymbalaria* Mill. J.

*Erinus alpinus* L. G, J. Mouth of River Fyne (Dr. MacLeay) ; Saddell (M. H. C.).

*Veronica hederæfolia* L. J.

\* *V. filiformis* Sm.

A small pubescent herb with numerous slender creeping stems, frequently forming patches amongst grass. Leaves very small, reniform, crenate, on short petioles. Flowers as large as those of *V. Buxbaumii*, but darker blue ; on very slender filiform pedicels several times longer than the leaves. Fruit not yet found in Britain.

A, C, J. Sunny places on roadsides, becoming frequent. 4-7. A recent introduction in this country, apparently now established and spreading.

*V. montana* L. J.

*Bartsia viscosa* L. G. Caruel, Loch Goil (an old record by Lightfoot, apparently overlooked). (Dr. MacLeay).

## LABIATÆ

*Mentha alopecuroides* Hull. A, J.

\* *M. rotundifolia* L.

Differs from *M. alopecuroides* in the roundish leaves, obtuse, coarsely crenate, strongly wrinkled above, shaggy or woolly beneath.

J. Moist places ; rare. 8-9. Peninver (M. H. C.).

\* *M. spicata* Huds.

Glabrous. Leaves sessile, oblong-lanceolate, sub-acute, serrate ; spikes slender ; corolla quite glabrous.

I. Wet ground ; rare. 8-9. Lamlash (R. McK.).

\* *M. cordifolia* Opiz.

Intermediate between *M. rotundifolia* and *M. spicata* ; probably a hybrid.

J. Rare. 8-9. Glenbrackerie (M. H. C.).

\* *M. piperita* Huds.

Leaves petiolate, ovate or oblong, acute, coarsely serrate ; upper smaller ; sparingly hairy on the nerves beneath.

A, B, E, I, J. Not common. 8-9. Clarkston ; Balmaha (R. McK.) ; Southend (M. H. C.) ; Kilchattan Bay.

\* *M. gentilis* L.

Allied to *M. sativa*, from which it differs in the leaves being much less hairy, the uppermost without flowers in their axils ; pedicels glabrous ; calyx-teeth ciliate.

B, J. Rare. 7-9. Giffnock (R. McK.) ; Glenbrackerie (M. H. C.).

*Nepeta Glechoma* Benth. J.

*Lamium album* L. G.

*L. maculatum* L. B. Glen Killoch.

## CERATOPHYLLACEÆ

\* *Ceratophyllum demersum* L.

A submerged aquatic, growing in still water. Stems many, slender, densely leafy ; rarely flowering. Leaves whorled, sessile, exstipulate ; dichotomously cut into linear toothed segments, dark green. Flowers minute, solitary, axillary, monœcious.

C. Ponds, lakes, etc. ; very rare. 7-9. Discovered in the Firhill timber-basin of the Forth and Clyde Canal by Mr. W. Rennie. (See *G.N.* vol. xiv, p. 38.)

## HYDROCHARIDACEÆ

*Elodea canadensis* Michx. A. Dalry (A. Shanks).



## ORCHIDACEÆ

- Neottia Nidus-avis* L. G, J. Tarbert (F. D.); Inver-  
array (Dr. MacLeay).  
*Listera ovata* Br. J.  
*L. cordata* Br. J.  
*Orchis mascula* L. J.  
*O. incarnata* L. J. Near Campbeltown (M.H.C.).  
*Habenaria viridis* Br. J. Southend (Rev. J. McRae).  
*H. bifolia* Br. J.

## LILIACEÆ

- Scilla verna* Huds. J. Ardnacross Bay (Dr. Mac-  
Leay).  
*Allium carinatum* L. I. Rothesay (I. C. C.).  
*A. paradoxum* G. Don. A. Doonfoot (F. D.).  
*Ornithogalum*  
*umbellatum* L. J. Near Carskey (M.H.C.).  
 \* *Gagea lutea* Ker.

Distinguished by its spreading perianth of 6 free seg-  
ments; stamens 6, with subulate filaments. Scape  
slender, about 6 in., erect, angular. Leaves linear, flat,  
longer than the scape. Bracts 2, linear-lanceolate, longer  
than the pedicels. Flowers few, in umbels; perianth  
greenish outside, yellow within, segments obtuse.

A, C. Woods; rare. 3-5. Largs (J. Boyd); Crossford.

## JUNCACEÆ

\* *Juncus filiformis* L.

Stems 4-8 in., very slender, pale green, filiform, with  
interrupted pith. Leaves all reduced to sheaths, or some-  
times with subulate tips. Cymes small, apparently  
lateral, sessile. Flowers few, crowded, pale. Perianth  
segments exceeding the obtuse mucronate capsule.  
Stamens 6.

E. Lake margins; very rare. 7-8. Loch Lomond,  
near Balmaha (R. McK.).

## ARACEÆ

- Arum maculatum* L. J. Southend (M. H. C.).

## ALISMACEÆ

- Alisma Plantago* L. J.

## CYPERACEÆ

- Scirpus setaceus* L. J.  
*S. Savii* Seb. & Maur. J. Cour (F. D.).  
*Schœnus nigricans* L. J. Carradale (M. H. C.).  
*Carex pauciflora* Lightf. G. Beinn Buidhe; Meall-nan-  
Tighearn (Dr. MacLeay).

\* *C. divisa* Huds.

Resembling *C. disticha*, but leaves involute, very narrow. Spikes interrupted, spikelets short, crowded, bracteate. Bracts filiform. Perigynia ovoid, not margined, equalling the ovate-cuspidate glume.

B. Moors and waste ground ; very rare. 6-7. Clarkston (R. McK.).

|                                |                       |
|--------------------------------|-----------------------|
| <i>C. vulpina</i> L.           | J.                    |
| <i>C. muricata</i> L.          | J.                    |
| <i>C. remota</i> L.            | J.                    |
| <i>C. aquatilis</i> Wahl.      | D.                    |
| <i>C. limosa</i> L.            | J. Cour Hill (F. D.). |
| <i>C. caryophyllea</i> Latour. | J.                    |
| <i>C. hirta</i> L.             | J.                    |
| <i>C. extensa</i> Good.        | J. Cour (F. D.).      |
| <i>C. lævigata</i> Sm.         | J.                    |
| <i>C. sylvatica</i> Huds.      | J.                    |

## GRAMINEÆ

|                                  |                                   |
|----------------------------------|-----------------------------------|
| <i>Milium effusum</i> L.         | D. Dullatur.                      |
| <i>Avena pratensis</i> L.        | J. Peninver.                      |
| <i>A. pubescens</i> Huds.        | J. Skipness (F. D.).              |
| <i>Koeleria cristata</i> Pers.   | J. Ardnacross Bay (Dr. Mac-Leay). |
| <i>Catabrosa aquatica</i> Beauv. | J. Ardnacross Bay (Dr. Mac-Leay). |

\* *Poa Chaixii* Vill.

An introduced grass, becoming established in some places. Stem fairly stout, 2-2½ ft., erect. Leaves broad, flat or keeled, sheaths strongly compressed. Panicle erect, resembling that of *P. trivialis* but larger.

C. Woods ; rare. 7-8. Core-house ; Castlemilk.

|                                |    |
|--------------------------------|----|
| <i>Glyceria aquatica</i> Sm.   | D. |
| <i>Festuca pratensis</i> Huds. | D. |

\* *F. sylvatica* Vill.

Stem 2-3 ft., erect, terete, smooth. Leaves involute ; ligule of upper sheath long ; lowest sheaths leafless. Panicle open, much branched ; spikelets ¼ in., ovate, yellowish. Glumes linear-subulate ; glumellas slender, acuminate, shortly awned.

E. Woods ; rare. 7. Near Rowardennan (R. McK.).

|                                |                  |
|--------------------------------|------------------|
| <i>F. gigantea</i> Vill.       | J.               |
| <i>Bromus asper</i> Murr.      | J.               |
| <i>B. sterilis</i> L.          | J.               |
| <i>B. racemosus</i> L.         | J. Cour (F. D.). |
| <i>Agropyrum repens</i> Beauv. | J.               |

## EQUISETACEÆ

*Equisetum maximum* Lamk. J.

## ISOËTACEÆ

*Isoetes lacustris* L. G, J. Inveraray ; Lochan-na-Inghinn (Dr. MacLeay).

## OPHIOGLOSSACEÆ

*Botrychium Lunaria* Sw. J.

## POLYPODIACEÆ

*Ceterach officinarum* Desv.

I. Near Rothesay.

*Asplenium marinum* L. J.

\* *A. lanceolatum* Huds.

Differs from *A. Adiantum-nigrum* in the more delicate bright green fronds, which are broadly lanceolate (not triangular-ovate), bipinnate, with broader and acutely serrate pinnules. (See notes by Dr. MacLeay).

J. Wet rocks ; very rare. 6-9. South Cantyre (M.H.C.).

*Dryopteris æmula* Kuntze. J.

## LYCOPODIACEÆ

*Lycopodium clavatum* L. J.

## NEW PLANT RECORDS FOR THE WEST OF SCOTLAND

By K. N. G. MACLEAY, B.Sc., Ph.D., F.L.S.

(Received December, 1952)

*Asplenium obovatum* Viv. (*A. lanceolatum* Huds.).

This interesting little fern, hitherto confined to the south and west coasts of England, Wales and Ireland was discovered in 1950 on the east shore of Cantyre (v.c. 101) by Miss M. H. Cunningham of Campbeltown, and identified by Mr. A. H. G. Alston of the British Museum (Natural History).

Mr. E. C. Wallace and I examined the colony in 1952 and we found it to consist of 14 plants, which appear to be well established and apparently quite native, growing in the crevices on the north side of a basalt dyke whose seaward end projects below high water mark. Associated with it were *Asplenium marinum* L. and *A. Adiantum-nigrum* L. for both of which it might easily be passed over. This is the only Scottish station which has so far been found, but a careful search on the rest of the Clyde coast and in the Hebrides would probably show the existence of other colonies.

***Spiranthes Romanzoffiana* Cham.**

Although this plant has been known for some time to occur in the islands of Colonsay and Coll (v.c.'s 102 and 103) it had never been reported from the mainland of Scotland until, in the summer of 1951, it was found growing in a field to the north of the River Shiel near Acharacle, in the district of Moidart (v.c. 97—Inverness) by Mrs. M. E. Tanner of Shrewsbury. She submitted it to the National Museum of Wales for identification, and it was verified by Mr. V. S. Summerhayes of Kew. The area where this plant has been found is on the direct line of the prevailing south-west winds from Coll and it is quite possible that viable seed could have been blown over the intervening sea to the mainland. Now that this American plant has become established on the mainland of Scotland it will be interesting to see if further colonisation occurs in Western Inverness and Argyll.

***Arenaria norvegica* Gunn.**

At the end of May 1952, Mr. E. C. Wallace and I were examining the vegetation of Morven (v.c. 97—Argyll) when we came across a colony of this arctic plant growing on rocky detritus at an altitude of 1,200 ft. - 1,500 ft. The area colonised was a very unstable rich loam on a steep slope facing north-west; there was very little vegetational cover except for this colony of about 100 plants with occasional *Arabis petraea* Lamk. as an associate. The only other known mainland station from Scotland is near Inchnadamph (v.c. 108) with the two island stations of Rhum (v.c. 104) and Unst (v.c. 112).

***Paris quadrifolia* L.**

In 1951 I discovered a fairly extensive colony of this local woodland plant growing in a basic flush in a natural Oak-Hazel wood on the eastern shore of Loch Awe (v.c. 98). The colony consisted of about 200 plants and was confined to an area of about 5 yards wide fronting the main road and stretching back into the wood for about 15 yards. Apart from Professor Heslop Harrison's Scalpay and Rhum (v.c. 104) records of 1935-6 this is the first time the plant has been recorded from north-west of the Clyde. The colony is in danger of being destroyed by a replanting programme of the Forestry Commission.



## FURTHER NEW AND NEWLY-CONFIRMED RECORDS OF THE DISTRIBUTION OF FRESH- WATER SNAILS IN THE WEST OF SCOTLAND.

By W. RUSSELL HUNTER, B.Sc., F.G.S.

(*Received May, 1953*)

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An earlier note in this journal reported new distribution records for three species of fresh-water Mollusca in the West of Scotland (Hunter, 1952b; see also Ellis, 1952). The present note is based mainly on collections made and determined by the author in the years 1951-53. It gives six further new records, while confirming the occurrence of certain other species for which verified records are scanty, either as a result of difficulty in specific determination, or of limited environmental range. It is a pleasure to record the author's indebtedness to Mr. A. E. Ellis, the Recorder of the Conchological Society, for his verification of specimens and helpful comments at all times; and again to acknowledge gratefully the continued interest and help of Professor C. M. Yonge, F.R.S., and Dr. H. D. Slack, F.R.S.E. The specific names and systematic arrangement used in the list below are those adopted in the most recent census of the British non-marine Mollusca (Ellis, 1951), and new vice-county records are marked thus\*.

**\* *Potamopyrgus jenkinsi* (Smith), Jenkins' Spire Shell.**

This snail was found in considerable numbers in three small, relatively calcareous lochs east of Glasgow: Bishop Loch, Woodend Loch and Lochend Loch (all in Lanark, vice-county 77). The distribution of this species is particularly interesting, as it was confined entirely to marine and brackish waters until near the end of the nineteenth century. The first record from inland fresh-water in England is dated 1893, and in Scotland it was first observed in 1906 in Perthshire, remaining confined apparently to the Tay Basin up to 1926 (Ellis, 1926). Up to the present (Ellis, 1951) the species has been confirmed from only two vice-counties in the West of Scotland (Dumfries, 72; Renfrew, 76), although it is recorded from nine east of the main watershed, and as far north as Orkney (111). It remains unrecorded from considerable areas in Scotland<sup>1</sup>. The rapid colonization of fresh-waters in Britain is paralleled elsewhere in Europe, and a detailed account of its spread through Denmark during thirty-five years has recently been published (Bondesen and Kaiser, 1949).

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1. But see the addendum to this paper.

**Lymnaea (Galba) truncatula** (Müller), Dwarf Pond Snail :  
and **L. (Stagnicola) palustris** (Müller), Marsh Snail.

No new vice-county records of these two species are reported, but it is of interest that both have been confirmed to occur in the marshy waters where the River Fruin enters Loch Lomond. In such acid soft waters *L. palustris* is stunted, and the shell-sculpture diagnostic of the species only poorly developed. As a result it is often difficult to distinguish from *L. truncatula*. On the other hand this sculpture is well shown in shells of *L. palustris* from the hard-water *P. jenkinsi* localities mentioned above. Further difficulty results from the fact that *L. truncatula* may have about four generations each year, each generation dying soon after breeding. Breeding does not take place at low temperatures, and it has been known for some time (Boycott, 1936), that the largest specimens are found early in the spring and in Scotland (*i.e.* those which have had the longest period of non-breeding growth). Such larger specimens, and specimens from hard waters, show the greatest tendency to develop the shell-sculpture and general shell-shape typical of *L. palustris*. It might be predicted that the closest simulation of the shell of *L. palustris* will be found in specimens of *L. truncatula* from calcareous localities at high altitude in North Scotland.

\* **Aplexa hypnorum** (L.), Moss Bladder Snail.

Specimens of this snail have been collected on several occasions at a point on the Rosdhu shore of Loch Lomond, where, perhaps as a result of the outfall of a small stream, the stones of the beach are covered with a thick growth of the moss, *Fontinalis antipyretica*. This is a new record for Dunbarton (99).

\* **Planorbarius corneus** (L.), Great Ram's-horn.

Specimens of this, the largest of the planorbid snails, have been collected from ponds in disused quarries at Windy Hill, west of Milngavie. This is a new record for Dunbarton (99), but is almost certainly a recent (human) introduction.

\* **Planorbis (Anisus) leucostoma** Millet, Button Ram's-horn.

A new record for this snail in Dunbarton (99) is established by its collection from two localities : in a large wet ditch on the Dunbarton Boulevard near Hardgate, and from the Fruin delta, Loch Lomond. The Loch Lomond population consists of exceptionally stunted specimens (mean shell-height or diameter=3.9mm. against 6.1mm. for specimens from Woodend Loch, Lanark), and Mr. Ellis commented that they resembled stunted ecarinate specimens he had seen from the Channel Islands.

\* **P. (Gyraulus) laevis** Alder, Smooth Ram's-horn.

This snail has been collected in shallow water in Loch Lomond, establishing a new record for Dunbarton (99). It is relatively rare in the loch, and seems to be limited to the mossy ground close inshore where *Aplexa* (see above) was recorded. Earlier records of this species occurring more extensively and in deeper waters (Meikle, 1949; Hunter, 1953; Weerekoon, 1953) are almost certainly erroneous, and may actually refer either to juvenile *P. albus* or to the stunted *P. leucostoma* mentioned above.

**P. (Gyraulus) albus** Müller, White Ram's-horn.

No new vice-county record of this species is reported, but it is of interest to note that it is one of the four most abundant snails in Loch Lomond, where it occurs far offshore on a wide variety of plants and substrata. The majority of specimens from the loch show a false keel caused by a peripheral fringe of spines on the shell. This character is not shown by specimens of this species from elsewhere in the district (e.g. from St. Germaine's Loch, Bearsden).

\* **P. (Armiger) crista** (L.), Nautilus Ram's-horn.

A new record for this snail in Dunbarton (99) is established by its collection in shallows off the mouth of the River Finlas, Loch Lomond. Though limited so far as is known to this locality, the snail occurred abundantly on a large patch of mixed vegetation which included *Potamogeton perfoliatus*, *Myriophyllum* sp. and *Ranunculus aquatilis*. The shells of specimens from this population were characterised by the weak development of the typical transverse ridges.

**P. (Bathyomphalus) contortus** (L.), Contorted Ram's-horn.

Although no new vice-county record of this species is reported, its presence at several points on the shores of Loch Lomond has been confirmed. (The last-mentioned five species are the only planorbids which have been collected to date in Loch Lomond.)

**Segmentina (Hippeutis) complanata** (L.), Flat Ram's-horn.

This snail is confirmed to occur at Woodend Loch, Lanark. This is not a new record, but the species is relatively rare in this district, Ellis (1951) noting its absence from most of the West of Scotland.



**Succinea (Oxyloma) pfeifferi** Rossmässler, Pfeiffer's Amber Snail.

No new vice-county record for this species is reported but during the summer of 1952 specimens were collected on the shore at Loch Lomond (vice-county 99, Dunbarton), and from marshy ground at Balinoe, Isle of Tiree (vice-county 103, South Ebudef; collected by Mr. J. Morton Boyd). These confirmed occurrences are worth noting as few records of the occurrence of *Succinea* spp. have been verified for Scotland since Quick (1933) published his important work on the genus. Authenticated records for *S. putris* are particularly scanty; this species, formerly believed to be widespread, has been verified for only three Scottish vice-counties (Ellis, 1951).

#### DISCUSSION

Some general aspects of these distribution records are worth noting. In the West of Scotland, the localities with the greatest number of species of fresh-water snails are undoubtedly the small hard-water lochs whose water drains over the carboniferous rocks of the Midland Valley. In addition to those mentioned above the following are among the eighteen species which have been collected in the Woodend Loch—Bishop Loch system: *Valvata cristata* Müller, *Bithynia tentaculata* (L.), *Lymnaea stagnalis* (L.), *L. (Radix) auricularia* (L.), and *Acroloxus lacustris* (L.). These five species are almost completely absent from fresh-waters to the north and west of Glasgow. An analysis in 1949 showed the water of Bishop Loch to contain 39.6 mg./l. calcium, which can be compared with values for Loch Lomond (from determinations by Dr. H. D. Slack using the calcium oxalate titration method) of from 2.3 to 3.3 mg./l. calcium. It is important to note that, although the softer waters of Loch Lomond (and of the smaller lochs in Dunbartonshire and Argyllshire) support fewer species of snails, those few species are often represented by an abundance of individuals. For example, four species are very abundant in Loch Lomond at different depths and on distinct substrata: *Valvata (Cincinna) piscinalis* (Müller), *Lymnaea (Radix) peregra* (Müller), *Physa fontinalis* (L.), and *Planorbis (Gyraulus) albus* Müller. Some account of the ecology of these snails has been given elsewhere (Hunter, 1953), in the course of a more detailed survey of the migrations of *L. peregra* in the loch, which migrations were noted earlier in this journal (Hunter, 1952a). Another general aspect of the snail fauna of Loch Lomond, which is brought out in the above list, is the prevalence (in populations of certain species) of stunted forms and forms with aberrant shell-structure.



Finally, it is appropriate to correct here an earlier record which is almost certainly erroneous: that of the occurrence in Loch Lomond of *Valvata (Cincinna) macrostoma* Mörch (see Meikle, 1949). Mr. A. E. Ellis has examined a series of *Valvata* from the loch, all of which he places in *Valvata (Cincinna) piscinalis* (Müller). The shell-form of *V. piscinalis* shows great variation in Loch Lomond, as it is known to do in larger lakes elsewhere in Europe.

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#### ADDENDUM

Since the above paper was submitted, the author has collected *Potamopyrgus jenkinsi* (Smith) from two further localities, one of which establishes another new vice-comital record. In May 1953, specimens were collected from Castle Loch, Lochmaben, Dumfries, thus confirming the occurrence of this snail in vice-county 72 (Ellis, 1951). In June 1953, the same species was found to be abundant in the highly calcareous Loch Baile a'Ghobhainn, in the island of Lismore, Main Argyll. This occurrence was reported to the Recorder of the Conchological Society, and makes the first formal record of this snail in vice-county 98. However, Dr. T. Warwick of the University of Edinburgh, who is working on variation in this species, remarks in a personal communication that he noted small numbers of the snails in two streams near Crinan, Main Argyll in 1946, although he did not submit specimens to the Conchological Society, to establish an official vice-comital record. Further, Dr. H. D. Slack believes that he has seen this species in a stream at Loch Seil, Main Argyll, so that *Potamopyrgus* is certainly established at more than one point in vice-county 98.

## A PRELIMINARY LIST OF STONEFLIES (Plecoptera) FROM THE GLASGOW AREA

By FRANK L. SINCLAIR, M.A.

(Received June, 1953)

Records of Plecoptera for the Glasgow area are few, and the 1901 *British Association Handbook* does not list this group. Stoneflies in Britain comprise a small group of about thirty species. The nymphs are found in stony streams, stony lake-shores and among aquatic vegetation; they may easily be collected with a hand-net. The adults are most easily collected resting on stones and herbage by the water-side. Using the keys of Hynes (1940, 1941) or Kimmins (1950), identification of nymphs and adults with a low-power microscope presents no great difficulty.

Although it is certain that it will be extended in the future the present list results from collections made over several years. Using the nomenclature of Kimmins (1950), specific names and localities are given, while in the case of adults the month of collection is noted.

I am indebted to Dr. Slack of Glasgow University for the records of *Leuctra nigra* and *Nemoura avicularis* from Loch Lomond. Dr. Hynes of Liverpool University kindly checked specimens whose specific identity was uncertain.

*Perlodes mortoni* Klapalek : Allander Water, Calder Glen, River Earn (Waterfoot); April; Common.

*Perla cephalotes* Curtis : River Earn (Waterfoot), River Clyde, Small stream Brodick (Arran); May, June; Common.

*Perla carlukiana* Klapalek : River Earn (Waterfoot), River Cart (Eaglesham); May; Common.

*Isoperla grammatica* (Poda) : Ardoch Burn, Halehall Burn (Eaglesham), River Gryffe, Neilston Burn, Calder Glen, Brock Burn, River Earn (Waterfoot); May; Common.

*Chloroperla torrentium* (Pictet) : Craigton Burn, Ardoch Burn (Eaglesham), River Cart, River Gryffe, Neilston Burn, River Clyde, Calder Glen, River Earn (Waterfoot); May; Common.

*Chloroperla tripunctata* (Scopoli) : Stream in Campsies near Strathblane.

*Capnia bifrons* Newman : Ardoch Burn (Eaglesham), River Earn (Waterfoot), River Cart; May.

*Brachyptera risi* (Morton) : Ardoch Burn (Eaglesham), stream in Campsies near Strathblane; March, May.

*Leuctra geniculata* Stephens : River Cart, River Gryffe, River Clyde, River Earn (Waterfoot); August; Common.

- Leuctra inermis* Kempny: Craigton Burn, Ardoch Burn (Eaglesham), River Clyde (Carstairs), River Cart, Allander Water, River Gryffe; May, July; Common.
- Leuctra hippopus* Kempny: Neilston Burn, Calder Glen, River Earn (Waterfoot); May; Common.
- Leuctra fusca* L.: River Cart, Allander Water, River Gryffe, Neilston Burn, streams in Arran, Cumbræ, Drumchapel; July, August, September; Common.
- Leuctra nigra* (Olivier): Loch Lomond.
- Protonemura meyeri* (Pictet): River Earn (Waterfoot), Ardoch Burn, Craigton Burn, Allander Water, Neilston Burn; May, June; Common.
- Protonemura praecox* (Morton): Stream in Campsies near Strathblane.
- Amphinemura sulcicollis* Stephens: Craigton Burn, River Cart, Ardoch Burn, River Earn (Waterfoot), River Gryffe; May, June; Common.
- Nemoura cinerea* Retz: River Cart, Ardoch Burn, outlet from Douglaston Loch; May, June; Common.
- Nemoura cambrica* Stephens: Neilston Glen, River Cart, Calder Glen; May; Common.
- Nemoura erratica* Claassen: Douglas Water (Lanark); May.
- Nemoura avicularis* Morton: Loch Lomond.
- Nemurella inconspicua* (Pictet): Ardoch Burn, Capelrig Burn, marsh in Drumchapel; May, August; Common.

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## A NOTE ON THE AMPHIBIOUS SNAIL

*Succinea pfeifferi* Rossmässler,

## IN A PREVIOUSLY UNDESCRIBED HABITAT

By W. RUSSELL HUNTER, B.Sc., F.G.S.

(Received December, 1952)

The pulmonate snails are divided into two suborders on anatomical grounds which involve the arrangement of eyes, tentacles, and genital organs. The anatomical division is paralleled by differences in habit: the Basommatophora live mostly in freshwater, the Stylommatophora are almost exclusively terrestrial. Among the latter however, there are two British genera, *Succinea* and *Zonitoides*, which include amphibious species found typically in marshy places. One of the more aquatic of these species, *Succinea pfeifferi*, has been found on several occasions in 1952 on the shores of Loch Lomond. In early autumn it was found to be particularly common in one micro-habitat which is worth recording. As a result of the acidity of the loch-water, fallen tree leaves are not rotted down quickly; they form large masses in the marginal waters of the loch, which become heaped up along the shore by wave-action in almost the same way as the sea forms a "tide-mark" of broken-off portions of seaweed. *S. pfeifferi* lives in this strand-line on certain parts of the shore, and also in the bundles of dead leaves which choke the smaller streams and ditches where they flow on to the beach. This micro-habitat could not be described as terrestrial, as large amounts of water are held between the leaves, and the other animals which occur with *S. pfeifferi* are aquatic species. They include the freshwater shrimp, *Gammarus pulex*, which has long been known to occur in abundance among plant debris in streams. It is of interest that species of the nearly-related genus *Marinogammarus* are the dominant members of the fauna inhabiting the tide-mark debris of the seashore. Other forms which were found in the Loch Lomond strand-line included the freshwater worms *Lumbriculus variegatus* and *Eiseniella tetraedra*, and pupae of a chironomid. A few of these pupae were kept until the adult midges emerged, and my thanks are due to Dr. J. W. H. Lawson for identifying an imago as *Brillia modesta*. It is probable that the larvae of *Brillia* live on stones on the loch bottom in shallow water and move to the edge only at pupation. Some specimens of the snail *S. pfeifferi* have since been kept in captivity and were found to feed on the leaves of oak, beech, alder and *Rhododendron*, feeding continuously both when submerged in water and when lifted out in moist air.



## NOTE ON THE GREAT SPOTTED WOODPECKER (PIED WOODPECKER), *Dendrocopus major* L.

During the winter of 1950-51, a couple of the Great Spotted Woodpeckers came daily to the "titbell" in my garden at Milngavie. In normal weather, visits were paid generally soon after daybreak and shortly before dark, but in severe weather they would make more frequent visits, refusing everything except fat. From a note in the *Bulletin*, I was aware that they visited another nearby house, but for the protection of the birds, I mentioned their visits to us only to reliable friends. The cock and the hen never appeared together. To begin with they gripped the top-suspending portion of the titbell with one foot and, upside down, dug into the fat. We then hung a second titbell a few inches from a post so that they could reach into it naturally by sitting on their tails on the post. They always chose this one in preference, and we got to know that if they were at the other bell the post one was empty.

On only one occasion did they make a noise. On a warm day in May, when they made only occasional visits, one of the birds stuck his beak into the fat which was apparently semi-solid, for it fell out. The bird gave a "squak" and did not return for months. In the winter of 1951-52 visits were few and far between and only one bird (the male) was seen, and, so far, there have been no visits since March, 1952. It may be that the birds suffered persecution, but I am inclined to think that there is another reason. There used to be a tall Poplar about 75 yards away which the birds frequently used as their observation post and when they saw that the coast was clear they dropped to a nearby hedge and then swept into the garden. They sometimes landed on my neighbour's clothes posts as a halfway halt. In 1951 the Poplar was severely trimmed and about a year ago reduced to a third of its size as it was getting into the way of telephone wires. The birds sometimes came from another direction but the Poplar was the place to which they most often retired if slightly disturbed and where they decided whether to return or depart.

Another neighbour tells me that in the summer of 1951 a single bird spent nearly ten minutes examining the poles of his tennis net.

February, 1953.

K. W. BRAID.

# LIST OF FIRST ARRIVALS OF SUMMER BIRDS IN CLYDE AREA IN 1952. COMPILED FROM REPORTS OF MEMBERS AND FRIENDS

BY THOMAS ROBERTSON

| <i>Bird</i>                          | <i>Date</i>                      | <i>Locality</i>   | <i>Average<br/>Date<br/>over 58<br/>years</i> | <i>Earliest<br/>Date, 1951</i> |
|--------------------------------------|----------------------------------|---|---|--------------------------------|
| Lesser Black-<br>Backed Gull         | Jan. 13<br>Feb. 26<br>Mar. 10    | Helensburgh<br>Richmond Park, Glasgow<br>Kelvingrove, Glasgow | Mar. 11                                       | Jan. 7                         |
| Heatear                              | Mar. 12<br>Mar. 14<br>Mar. 15    | Stevenston<br>Southend, Kintyre<br>Ballantrae                 | Mar. 25                                       | Mar. 31                        |
| Puffin                               | Mar. 15<br>April 2<br>April 12   | Southend, Kintyre<br>Helensburgh<br>Largs                     | April 8                                       | April 9                        |
| Willow<br>Warbler                    | Mar. 15<br>April 10<br>April 10  | Ballantrae<br>Netherlee, Glasgow<br>Southend, Kintyre         | April 12                                      | April 18                       |
| Wood Martin                          | Mar. 29<br>April 5<br>April 9    | Drymen<br>Loch Bowie, Dumbarton<br>Southend, Kintyre          | April 9                                       | April 14                       |
| White Wagtail                        | April 10<br>April 17<br>April 19 | Netherlee<br>Stevenston<br>Hamilton                           | April 4                                       | April 9                        |
| Wallow                               | April 10<br>April 10<br>April 11 | Dalry<br>Southend, Kintyre<br>Bardowie                        | April 10                                      | April 10                       |
| Turnstones<br>(Common<br>and Arctic) | April 12<br>April 27<br>May 4    | Ballantrae<br>Helensburgh<br>Southend, Kintyre                | May 8   | April 18                       |
| House Martin                         | April 13<br>April 24<br>April 25 | Balfron<br>Largs<br>Helensburgh                               | April 25                                      | April 21                       |
| Common<br>Sandpiper                  | April 13<br>April 14<br>April 16 | Ettrick Bay<br>Helensburgh<br>Dalry                           | April 13                                      | April 20                       |
| Tree Pipit                           | April 18<br>May 3<br>May 7       | Douglas Muir<br>Lochwinnoch<br>Helensburgh                    | April 23                                      | April 28                       |

| <i>Bird</i>                    | <i>Date</i>                      | <i>Locality</i>   | <i>Average<br/>Date<br/>over 58<br/>years</i> | <i>Earliest<br/>Date, 1811</i> |
|--------------------------------|----------------------------------|---|---|--------------------------------|
| <b>Redstart</b>                | April 18<br>April 26<br>May 3    | Douglas Muir<br>Rowardennan<br>Lochwinnoch                                  | April 26                                      | April 2                        |
| <b>Whinchat</b>                | April 18<br>May 3<br>May 3       | Southend, Kintyre<br>Gartocharn<br>Motherwell                               | April 28                                      | April 2                        |
| <b>Yellow<br/>Wagtail</b>      | April 19<br>May 3                | Hamilton<br>Lochwinnoch   | April 21                                      | May                            |
| <b>Cuckoo</b>                  | April 21<br>April 23<br>April 24 | Gartocharn<br>Dalry<br>Kilmacolm  | April 22                                      | April 1                        |
| <b>Corncrake</b>               | April 25<br>May 1<br>May 3       | Dalry<br>Southend, Kintyre<br>Darvel  | April 25                                      | April 2                        |
| <b>Grasshopper<br/>Warbler</b> | April 25<br>May 4<br>May 10      | Drymen<br>Helensburgh<br>Millport   | May 5   | May                            |
| <b>Sedge<br/>Warbler</b>       | April 27<br>April 30<br>May 3    | Balmaha<br>Southend, Kintyre<br>Darvel ; Mearnskirk ; Motherwell            | May 2   | April 2                        |
| <b>Wood Warbler</b>            | April 27                         | Shandon   | May 3   | May                            |
| <b>Swift</b>                   | April 28<br>April 29<br>May 1    | Largs<br>Hillhead, Glasgow<br>Croftfoot, Glasgow                            | May 2   | May                            |
| <b>Common<br/>Whitethroat</b>  | April 30<br>April 30<br>May 3    | Drymen<br>Southend, Kintyre<br>Dalry; Kilmacolm; Lochwinnoch;<br>Motherwell | May 1   | April 1                        |
| <b>Spotted<br/>Flycatcher</b>  | May 2<br>May 9<br>May 10         | Torrance<br>Southend, Kintyre<br>Drymen                                     | May 11  | May 1                          |
| <b>Garden<br/>Warbler</b>      | May 5<br>May 10<br>May 14        | Rossdhu<br>Darvel<br>Pollok Park  | May 9   | May 1                          |
| <b>Hoopoe</b>                  | April 13                         | Hunter's Quay   | } Rarities seldom<br>reported.                |                                |
| <b>Turtle Dove</b>             | May 23                           | Southend, Kintyre   |   |                                |

## LIBRARIAN'S REPORT

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The outstanding item to report this year is the receipt of 25 volumes, on various branches of Natural History, mainly of a Geological nature. This is a valuable addition kindly gifted by one of our own members, Mr. Ernest Stollery.

The year's work at the Mitchell Library has been particularly concerned with the ultimate storage elsewhere of the back numbers of little used periodicals.

The number of volumes issued to members was 62.

—JAMES GRAHAM.

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## REPORT ON THE PROCEEDINGS OF THE BRITISH ASSOCIATION MEETING CONFERENCE OF DELEGATES, BELFAST, 1952

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On Wednesday, 3rd September, the Conference of Delegates joined in General Committee when the Council of the British Association submitted a resolution granting the delegates a new title and new status, with special functions and responsibilities. The new title is to be the *Assembly of Corresponding Societies* and this has been created a section, known as *Section X*, with a President and a Recorder. It will function, with special interests for Students and Juniors, in organising lectures and excursions, promoting interest in Science by offering subjects for discussion and essay, for the best of which prizes will be awarded.

On Thursday, 4th September, Mr. J. A. S. Stendall, the President of *Section X* delivered an address on "Problems and Responsibilities." He spoke of the changing structure of society during the past fifty years and gave a survey of the Belfast Natural History Societies for that period.

On Friday, 5th September, delegates attended an afternoon excursion to the town of Antrim and the shores of Lough Neagh. Mr. Stendall led the excursion and Mr. Hewitt, the Art Director of the Museum, described the points of interest. Visits to the Round Tower and an old Elizabethan Church were of great historical interest. The route back to Belfast was over the Antrim plateau, descending from the lavas to the cretaceous, lias and trias rocks, affording some wonderful views of Belfast and the country beyond.

On Monday, 8th September, a luncheon was held at the Art Gallery and Museum. Following this, the delegates attended a meeting to hear the Earl of Antrim give an account



of the work of the National Trust of Northern Ireland and a talk by Mr. Denis Hanna on Ulster's Architectural Heritage. At a special meeting following these addresses a new committee was elected to assist in framing a programme based on the extended activities of the Section; the writer was invited to become a member of the committee and accepted the appointment.—JAMES S. NICOL.

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## REPORT OF REPRESENTATIVE TO THE COMMITTEE OF THE SCOTTISH MARINE BIOLOGICAL ASSOCIATION

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Several ecological surveys have been carried out, in the Sound of Jura and adjacent sea lochs from Crinan to West Loch Tarbert, using the research vessel, "Calanus," and round the Caithness and Sutherland coasts from Wick to Scourie. Oyster breeding experiments at Millport and Easdale and fishery research have been continued. Among new developments has been the acquisition of an under-water television camera and ancillary equipment; Millport is one of the few places in the country to possess this costly apparatus.

Rare animals found were the wreck fish *Polyprion*, a loggerhead turtle, a tunny and a giant squid.

The seven Elmhirst Memorial Lectures are to be published in book form.—JOHN WEIR.

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## NOTES FROM THE REPORTS OF SOCIETY EXCURSIONS

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DARNLEY GLEN, 5TH APRIL, 1952—*Leader*, MR. JAMES S. NICOL.

Six members attended and, in spite of heavy rain, the party proceeded to the Darnley quarries, noting on the way the white butterbur, *Petasites albus*, in flower. The main quarry was explored, the dip of the Arden limestone taken, and general features noted.

---

AUCHINCRAIVE, 14TH APRIL, 1952—*Leader*, Professor K. W. BRAID.

Twenty-one members and friends attended.

Through the courtesy of the Governors and Principal of the West of Scotland Agricultural College, the party was

shown over the spectroscopic, poultry, milk-testing and soil testing departments and through the gardens.

Professor H. Nicol, F.R.S.E., had arranged for Mrs. Watt to show the spectroscopic department. She most interestingly demonstrated the instruments, their electrodes and the methods of examining the resulting photographs and calculating the values. These instruments make it possible to estimate minute traces of elements in soils and plant or animal tissue. Miss Kirk, of the Poultry Department, showed how the large incubator worked and answered many questions. Professor D. Smillie, in a racy half hour's talk, described and illustrated how milk is tested for health purposes. He also exhibited a vegetable renin, which, however, in its present state, is too impure for use in cheese production. Dr. J. Grainger gave most interesting demonstrations to show how soils can be tested to make sure that they are suitable for crops, and, with the aid of a film-strip, he described the life history of the potato eelworm; he showed the soil injector which he has designed to combat the trouble and for which he has been awarded an R.H.A.S. Silver Medal.

In the Hanging Gardens were noted *Forsythia suspensa*, *Choisya ternata* (the Mexican Orange Flower), *Magnolia stellata* and what the older members still like to call *Cydonia* (*Pyrus*) *japonica* (the Japanese Quince). In the vinery the company was interested in a huge plant of dodder (a total parasite) growing on *Pelargonium*. In the gardens Miss W. Wilson deputised for Dr. Dovaston and showed us his plants from seeds from Nepal; she called our attention to the seedlings of *Primula farinosa* from seeds treated with colchicine in an effort to produce new types. A large clump of *Pieris japonica* in full flower and groups of *Primula rosea* caused much comment but one of the chief centres of interest was the small plant of *Metasequoia glyptostroboides*, relic of a former vegetation kept alive in a Chinese monastery; seeds of this plant recently sent to Britain have been germinated and distributed; the plant is hardy, and, unlike most conifers, roots easily from cuttings and tends to produce multiple heads.

---

DOLLAR GLEN AND CASTLE CAMPBELL, joint with  
Edinburgh Natural History Society, 24TH MAY, 1952—  
Leader, DR. PATTON.

Eleven members attended.

The scenery of the Glen was magnificent, the geology interesting. Botanically, perhaps owing to the dry season, the glen was disappointing although in one locality several plants

of toothwort, *Lathraea squamaria*, parasitic on a wych elm were observed and the pellitory of the wall, *Parietaria officinalis*, was abundant on the castle wall. It appeared, however, to be an excellent hunting-ground for bryophytes.

---

BENMORE GARDENS AND PUCK'S GLEN, 26TH MAY, 1952—*Leader*, Mr. B. W. RIBBONS.

Thirty-eight members and friends took part in this excursion.

The plants noted included the two British species of filmy fern, *Hymenophyllum Wilsoni* and *H. tunbridgense*; the mosses *Trichostomum tenuirostre*, *Hookeria lucens*, *Heterocladium macounii*, *Hylocomium flagellare*; the hepatics *Aneura latifrons*, *Metzgeria hamata*, *Eucalyx hyalinus*, *Aplozia sphaerocarpa*, *Saccogyna viticulosa*, *Nowellia curvifolia*, *Lepidozia pinnata*, *Scapania curta*.

The party returned through the magnificent avenue of *Sequoia gigantea* to Benmore House where they were received by the gardener, Mr. Penman. During the afternoon the Gardens and Arboretum were inspected under his guidance. Many of the rhododendrons and tree-heaths were in full flower and the South American bush *Tricuspidaria* was particularly admired. In the walled-garden the *Meconopsis* species were at their best and the New Zealand willow-herb, *Epilobium pedunculare*, was noticed among some stones at the side of the path. We are much indebted to Professor Sir William Wright Smith by whose courtesy this visit was made possible.

---

MILLPORT AND MARINE BIOLOGICAL STATION, 7TH JUNE, 1952—*Leader*, Mr. PRASHER.

Seventeen members took part in this excursion.

Dr. Gould exhibited jellyfish and gave a talk on these.

The most noteworthy plants found were:—Water crow-foot, *Ranunculus trichophyllus*; crow-berry, *Empetrum nigrum*; brookweed, *Samolus Valerandi*; *Orchis incarnata*; *Claytonia perfoliata*.

---

ALPINE EXCURSION (BEN LAWERS), 5TH JULY, 1952—*Leader*, Mr. JAMES ANDERSON.

The party (thirty in number) travelled by bus to Ben Lawers Hotel; as on former occasions, some climbed the Ben, others botanised the shore of Loch Tay. The usual alpine plants were noted by the climbers who from the summit obtained a magnificent view: Ben Nevis was seen to the



north-west, while to the west could be seen the twin peaks of Ben More and Stobinian and beyond these Beinn Laoigh and Ben Cruachan.

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ROUKEN GLEN, 2ND AUGUST, 1952—*Leader*, Miss M. G. SCOTT.

Twelve members attended and were joined by several members of the Field Studies Association.

Interesting plants noted were :—Yellow archangel, *Lamium Galeobdolon*; wall lettuce, *Lactuca muralis*; broad-leaved helleborine, *Epipactis latifolia*; melancholy thistle, *Cirsium heterophyllum*.

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PORTENCROSS to HUNTERSTON, 6th SEPTEMBER, 1952—*Leader*, Mr. JOHN BOYD.

Nineteen members took part in this excursion.

Over 70 genera of plants were found and of these between 50 and 60 species were in flower.

In the vicinity of the trap dyke we investigated some potato fields where the orders Chenopodiaceæ and Polygonaceæ were well represented, with here and there a fine corn sow-thistle, *Sonchus arvensis*, small nettle, *Urtica urens*, a solitary specimen of tufted loosestrife, *Lythrum Salicaria*, corn-flower, *Centaurea Cyanus*, bugloss, *Lycopsis arvensis*. Grass of Parnassus, *Parnassia palustris*, flourished on the moist turf above the rocks by the shore; on more stony ground occurred skull cap, *Scutellaria galericulata*, along with its scarcer associate gipsywort, *Lycopus europæus*. Where the sea was biting into the land and leaving isolated hummocks of turf towards high water mark, we found abundance of celery-leaved crowfoot, *Ranunculus sceleratus*, in little brackish pools, and, nearer the salt water, the sea aster, *Aster Tripolium*.

---

LOCH STRIVEN, 29TH SEPTEMBER, 1952—*Leader*, Mr. LOTHIAN.

Eight members arrived in Dunoon by steamer on a beautiful sunny morning for this excursion. Owing to transport difficulties, it was decided to spend the day in the Rumbling Bridge - Lock Eck area. Chaffinches and linnets were singing with unusual zest for so late in the year; a pair of bullfinches was observed. Peacock (*Nymphalis io*) and small tortoiseshell (*Aglais urticae*) butterflies were seen. The larvae of the Fox Moth (*Macrothylacia rubi*) and of the Oak Eggar Moth *Lasiocampa quercus* (probably variety *callunae*) were found.



## SECTION REPORTS.

## BOTANICAL SECTION (Convener, Mr. Prasher)

Fifteen excursions, with an average attendance of ten members, were carried out. On 19th April a visit was made to the Paisley Museum, where Mr. Hood conducted the party and showed a particularly fine herbarium.

Interesting "finds" were as follows:—

Kilmacolm : *Epilobium pedunculare*, *Lactuca muralis*.

Possil Marsh : *Carex disticha* (in abundance), *Stellaria glauca* (reduced in numbers).

Annick Lodge, by Irvine : *Pyrola minor*, *Epipactis latifolia*.

Castlemilk : *Stellaria nemorum*, *Impatiens Noli-me-tangere*, *Potamogeton crispus*, *Milium effusum*, *Trisetum flavescens*, *Poa Chaixii*.

Fiddler's Gill, Braidwood : *Ranunculus auricomus*, *Paris quadrifolia*.

Fin Glen : *Meum athamanticum* (a new station for this plant).

Dalry : *Lepidium Smithii*, *Teesdalia nudicaulis*, *Ononis repens*, *Agrimonia Eupatoria*, *Epilobium hirsutum*, *Senecio viscosus*, *S. sylvaticus*, *S. saracenicus*, *Tragopogon pratensis*, *Echium vulgare*, *Carex teretiuscula*, *Glyceria aquatica*, *Ophioglossum vulgatum*.

## ENTOMOLOGICAL SECTION (Convener, Mr. Lothian)

Three excursions were arranged and carried out; a start was made with the Survey of the Arden Basin. No species new to the Clyde area was recorded during the season, but the Green Hairstreak butterfly (*Callophrys rubi*) and the Clouded Yellow butterfly (*Colias croceus*) appear to be more widely distributed than before.

## ORNITHOLOGICAL SECTION

(Convener, Mr. Robertson)

Members of the Section kept watch for the arrival of summer migrants (see p. 93) and for other interesting species. Rarities reported were:—Hoopoe, at Hunter's Quay; turtle dove, at Southend, Kintyre, and near Glasgow; pied flycatcher, at Ballagan; Iceland gull at Hamilton.

A programme of ten field excursions, of which four were joint with the Botanical Section, was carried out, a total of 73 species being recorded. Three visits were made to the Banks of Clyde at Hamilton to observe the change from the winter population to the summer one; immense numbers of

duck are the early attraction, the wigeon being especially numerous; other waterfowl seen were pintail, pochard, tufted duck, shoveler, mallard, teal, whooper swan (17 on 29th March), great crested grebe (two nests), little grebe. Of the summer migrants nine species were seen: these included the white wagtail and the yellow wagtail which are both of regular occurrence each Spring, and hundreds of sand martins and swallows.

Two evening visits were made to Pollok Park to listen to bird song: the outstanding species noted were garden warbler, chiffchaff, woodcock (roding).

The individual bird which aroused most admiration was a fine red-breasted specimen of the black-tailed godwit seen at Cardross on 26th April; this is a rather rare passage migrant on the Clyde. Of interest also were the heronries at Hamilton and Kelburne, and the common buzzard—a pair are apparently nesting at Kelburne.

A bird which is increasing in numbers again after an eclipse of many years is the yellow wagtail: it has occupied a number of new nesting grounds in the last year or two, but with its specialised habitat of meadows or meadow-like land it can become only locally common.

## GEOLOGICAL SECTION (Convener, Mr. Nicol)

Visits were made to Ballagan and Murroch Glen, two favourite centres for our activities. At Ballagan it was observed that considerable erosion had taken place during the winter floods and fossil markings which had been noticed on former visits had disappeared. A commencement was made with the project of Surveying the Arden Basin and some progress has been made in the preliminary mapping of the area. Three excursions were made to the separate sections of the Survey but the work was interrupted by unfavourable weather conditions. The winter meetings have been well attended and enjoyed by members; the papers and discussions were of a high standard.

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## DIGEST OF THE PROCEEDINGS OF THE SOCIETY

8TH JANUARY, 1952

Professor K. W. Braid presided.

Five new members were admitted:—Mrs. Janet Armstrong, 14 Campbell Drive, Bearsden; Mrs. Dorothy Maud Watt, 97 Essex Drive, W.4; Miss Margaret McCombie, 13 Clevedon Drive, W.2; Miss Janet S. Hay, M.A., 87 Crookston Drive, Paisley; Mr. Robert Elliot, Roselea, Carmunnock.

The Annual Exhibition of the Photographic Section was presented by Mr. C. E. Palmar, A.R.P.S., Convener. He introduced the following contributors, who showed lantern slides and gave interesting commentaries upon them:—Mr. Alfred Slack, Dufaycolour slides of Scottish alpine plants and some of the lower hillsides; Mr. Wm. J. Cannon and Miss E. Brock, each showing slides of geological interest—mountain and island scenery of the West of Scotland; Miss B. P. Macfarlane, mountain scenery in Europe; Dr. Hutchison, colour slides of American spring plants of woodland, meadow and desert, views of California and the Grand Canyon; and Mr. S. D. Stevenson, colour slides of shore and sea-birds taken in Ayrshire. On the walls were enlarged photographs of birds and plants, taken by Mr. Palmar and others, and one photo-micrograph showing the growth of a crystal, by Dr. Vand.

12TH FEBRUARY, 1952.

Professor Braid presided at the opening of the Annual Business Meeting.

Eleven new members were admitted:—Mrs. G. M. T. Conacher, Miss Elizabeth R. T. Conacher and Miss Nancy C. T. Conacher, An Fharaid, Lawmarket Road, Bridge of Weir; Miss Isabella C. Macdonald, M.A., 2 Rosslyn Avenue, Rutherglen; Miss Barbara Glen, Police House, Ralston; Mrs. Janet Ferguson, M.A., 16 Almond Street, E.1; Miss A. McCutcheon, M.A., 38 Leven Street, S.1; Mr. James W. Scougall, M.A.(Cantab.), 96 Gibson Street, W.2; Mr. George Tomney, 105 Raeberry Street, N.W.; Dr. Samuel Williams, Ph.D., D.Sc., Botany Department, University; Mr. R. Hunter, c/o Girvan, 17 Luath Street, S.W.1.

The reports of the Society's activities were read and approved. On his election as President, Dr. Patton took over the chairmanship, and paid tribute to the work done by Professor Braid during his term of office. The other office-bearers were then elected (p. 102). New Section Conveners elected were:—Geology, James S. Nicol; Zoology, Alex. R. Hill, B.Sc., Ph.D., F.R.E.S.

11TH MARCH, 1952.

Dr. Patton presided.

Five new members were admitted:—Miss Freda K. Neill, M.A., 27 Lansdowne Crescent, N.W.; Miss Aileen A. G. Kelly, 146 Garscadden Road, W.3; Mr. E. M. Laing, 17 Park Terrace, C.3; Mr. Alex. C. Galt, 96 Govanhill Street, S.2; Mr. Alex. M. Ramsay, 1015 Aikenhead Road, S.4.

Mr. Boyd read a memorandum on the life of Robert Broom.

Mr. James W. Scougall, M.A., gave an address on "The Basis of Heredity."

7TH APRIL, 1952.

Dr. Patton presided.

Four new members were admitted:—Mr. Donald Stalker, 26 Carrick Drive, E.2; Mr. Victor Gregory, 15 Seamore Street, N.W.;



Dr. Basil C. King, D.Sc., Ph.D., F.R.S.E., F.G.S. and Mrs. Dorothy M. King, B.Sc., 57 Woodend Drive, W.3.

Mr. Johnstone read an obituary notice on Rev. Robert Barr.

Mr. James Kirkwood delivered a lecture on "Continental Drift."

19TH MAY, 1952.

Dr. Patton presided.

Two new members were admitted:—Miss Macleod, Backhill Cottage, East Hillside, Cambuslang; Mr. Andrew Hutchison, M.A., B.Sc., 13 Queensborough Gardens, W.2.

Dr. Kenneth N. G. MacLeay, B.Sc., Ph.D., F.L.S., gave an illustrated address entitled "The Sudan of Today."

9TH JUNE, 1952.

Dr. Patton presided.

Professor K. W. Braid was congratulated upon receiving the O.B.E. in the Queen's Birthday Honours List.

Mr. Thomas Robertson submitted a list of the first arrivals of Summer Birds in the Clyde Area (p. 93) and commented upon features of interest in it.

The Annual Exhibition, with contributions from the various Sections, was held. In connection with the Arden Survey, Mr. Cannon showed a map on which the fossil-bearing strata were marked, together with some specimens of the fossils.

14TH OCTOBER, 1952.

Dr. Patton presided.

Four new members were admitted:—Miss Irene Watson, 14 Whittinghame Drive, W.2; Mr. William A. Scott, B.Sc., 63 High Street, Lanark; Mr. Thomas E. Shankland, 29 Taymouth Street, E.2; Mr. Sydney A. J. Oldham, N.D.H., 16 Dumbreck Road, S.1.

Mr. Thomas Robertson and Mr. Richard Prasher gave talks on Migrant Birds.

11TH NOVEMBER, 1952.

Dr. Patton presided.

Miss Sheila M. Blue, B.Sc., 11 Rouken Glen Road, Thornliebank, was admitted to membership.

Mr. Thomas H. M. Gordon read a paper entitled "Insects are many—Students so few."; he gave a survey of the study of Entomology, paying tribute to the work of amateurs, particularly Mr. A. Fergusson and Mr. Cuthbertson, late members of the Society; he demonstrated how scales are used in the identification of insects.

9TH DECEMBER, 1952.

Dr. Patton presided.

Two new members were admitted:—Mr. D. H. N. Spence, B.Sc., Botany Department, University; Mr. Alistair Fraser, B.Sc., Zoology Department, University.

Mr. B. W. Ribbons exhibited specimens of *Equisetum hyemale* L. found in Wester Ross.

Mr. Lee read the paper "Additions to the Flora of the Clyde Area" (p. 65). Mr. Daniel M. Lothian gave a talk entitled "A Lepidopterist in Germany."

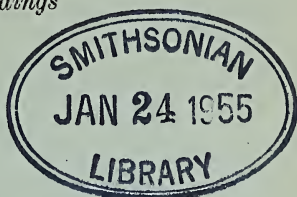
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January 7, 1955

# The Glasgow ✧ Naturalist

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# CONTENTS

---

|   | PAGE |
|---|------|
| PAPERS—   |      |
| The British Herbarium of the Botanical Department of<br>Glasgow University                          |      |
| Donald Patton, M.A., B.Sc., Ph.D., F.R.S.E. ... ..  | 105  |
| Dr. James Cargill—an early Aberdeen Botanist  |      |
| K. W. Braid, O.B.E., M.A., B.Sc., B.Sc.(Agric.), F.L.S. ...   | 127  |
| On the situation and geological structure of the Garvelloch<br>Islands                              |      |
| W. Russell Hunter, B.Sc., Ph.D., F.G.S., and David A.<br>Muir, B.Sc. ... ..                         | 129  |
| A Note on Insects from the Garvelloch Islands   |      |
| David A. Muir, B.Sc. ... ..   | 140  |
| The Birds of the Garvelloch Islands   |      |
| Margaret H. Dunn, W. Russell Hunter, B.Sc., Ph.D.,<br>F.G.S., and Alasdair Dunn, D.A. ... ..        | 142  |
| On Animal Ecology in the Garvelloch Islands   |      |
| W. Russell Hunter, B.Sc., Ph.D., F.G.S. ... ..  | 147  |
| List of First Arrivals of Summer Birds in Clyde Area in 1953<br>compiled by Thomas Robertson ... .. | 151  |
| EXCURSION REPORTS ... ..  | 153  |
| SECTION REPORTS ... ..  | 154  |
| LIST OF OFFICE-BEARERS ... ..   | 155  |
| DIGEST OF THE PROCEEDINGS OF THE SOCIETY ...  | 156  |
| OBITUARY—REV. ROBERT BARR, M.A., T.D., J.P.   |      |
| by R. H. Johnstone, M.A. ... ..   | 158  |

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## THE BRITISH HERBARIUM of the BOTANICAL DEPARTMENT OF GLASGOW UNIVERSITY

By DONALD PATTON, M.A., B.Sc., Ph.D., F.R.S.E.

*(Delivered 13th October, 1953)*

In accordance with the custom of this Society it falls to me to deliver a Presidential Address.

It has been said that Presidential Addresses are of two kinds; the first is that which treats of science generally, the other that which deals with some special subject. Between these two there seems to be no middle course, and, as I did not seem able for the first form of address, I have chosen the other alternative and wish to speak to you to-night on The British Herbarium of the Botanical Department of Glasgow University.

The University may well be proud of its Herbarium, both on account of the contributors to it and because of the species which it contains. The British Herbarium consists of three outstanding herbaria: (a) The Flowering Plants, Vascular Cryptogams and Charophytes; (b) The Bryophytes; (c) The Algae.

### A. THE FLOWERING PLANTS, ETC.

Being Honorary Curator of The British Flowering Plants, etc., I shall deal with them first and at some length.

After his retirement from the Regius Chair of Botany (1925) Professor F. O. Bower, at the request of Dr. Case, supplied a general description of the complete Departmental Herbarium as it then existed. The following are excerpts from this manuscript in so far as they refer to the British Herbarium:—

“The Chair of Botany was instituted in 1818. Prior to this I know of no record of any herbarium belonging to the University . . . and after that date there seems



to have been none until the purchase of the private Herbarium and Library (for, I believe, £700) from the Trustees under the Will of Professor G. A. Walker Arnott who died in 1868.\* Up to this date such herbaria as existed were the private property of the Professor. Each of the three earliest Professors was noted elsewhere. Professor Graham, after three years in Glasgow, proceeded to Edinburgh. Sir William Hooker (1821-1840) possessed a very fine herbarium, kept in his own house at Woodside Crescent. But on his promotion, as the first Director of Kew, he took it away with him.

During Sir William Hooker's tenure in Glasgow there appears to have been no University Herbarium.

Sir William Hooker's successor was Professor Hutton Balfour, but on promotion to Edinburgh, after four year's tenure in Glasgow, he left no collection behind.

He was succeeded by Professor Walker Arnott, a Laird of Arlary, who formed a large collection housed at Dowanhill. . . . The plants had never been properly poisoned and were liable to deteriorate. The collection was arranged in three parts, one of these was a general herbarium; a second was a special herbarium on which 'Hooker and Arnott's *Flora Indiae Orientalis*' was based. The third was a British Herbarium, kept in a mahogany cabinet with drawers—which when Balfour arrived in Glasgow was being used as a side-board in the Bedellus' house! None of its specimens was poisoned, and the plants and labels were all loose; and so I found them in 1885."

Professor Bower continues:—

"The British Herbarium I took in hand after 1885. All the specimens were poisoned and fastened down on new paper with their labels.

There were no substantial additions to the herbarium till the end of the century.

The British Herbarium was kept separate with Walker Arnott's set as its foundation. But there have since been very valuable additions from Kidston and Alex. Somerville."

From Professor Bower's manuscript we gather that, in the early days, the plant collections were very often neglected and most inadequately housed. The accommodation of the Botany

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\* "The Society voted a sum of ten guineas as a subscription to the fund now being raised by the University for the purchase of the late Professor Walker Arnott's Herbarium and Library."

*Proc. Nat. Hist. Soc., Glas., Vol. I., p. 254, 1869.*

Department was then very limited. But, when the new Botany buildings were opened in 1901, a special room was set apart as a Herbarium. The old "Walker-Arnott" cabinets, though still retained, were considerably refitted and made more or less dust-proof. Some of these were used to house the British Herbarium. Thus they remained until Professor Walton came to occupy the Chair of Botany in 1930. Realising that the cabinets had not proved dust-proof—far from it—he, whilst still using the old cabinets, had the sheets of specimens enclosed in well-fitting cardboard boxes specially made for the purpose. In these boxes each species, in Vice-County order, is arranged in a separate folder. And that is how the British Herbarium stands to-day. It contains between 30,000 and 40,000 sheets and is arranged according to the 11th Edition of the London Catalogue of British Plants.

This British Herbarium has become a herbarium of herbaria. Since 1930, over a dozen have been gifted to the Department, the most valuable being the one presented by the Senate of Trinity College, Glasgow, and Peter Ewing's.

In addition to the general British Herbarium two individual herbaria are worthy of note. The one now displayed in swing-cases is referred to by Professor Bower in his manuscript, thus, "The set of British Plants in the flap-cases in the Museum was mainly made up from a small sheet herbarium purchased for the purpose, and blanks mostly made up from other sources.—I think it is a complete set within 5% of blanks." The other herbarium is that presented in 1938 by John R. Lee, M.A. It is a more or less complete collection of British plants, beautifully mounted and labelled, and is contained within its own cabinet—the workmanship of Peter Ewing.

The principal herbaria which have been acquired by the University belonged to the following:—

(\* indicates member of the *Nat. Hist. Soc.*, Glasgow.)

\*ARNOTT, GEORGE A. WALKER, LL.D. (1799-1868).

Professor of Botany, Glasgow University, 1845-1868.

Herbarium purchased in 1869, was amassed by the Laird of Brodie.† It contains the herbarium of David Stuart of Edinburgh and also specimens collected by George Don, Sir James Smith, Professor Robert Graham, Dr. Goodenough, etc.

c. 4,000 sheets, dating from 1786.

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† (a) See *Proc. Nat. Hist. Soc.*, Glasgow, Vol. I., p. 6, 1860.

(b) In *Collectanea for a Flora of Moray* mention is made of "The valuable Herbarium of the late Laird of Brodie (now in the possession of David Stuart, Esq., Edinburgh)." 1839.

BALFOUR, JOHN HUTTON, M.D. (1808-1884).

Professor of Botany, Glasgow University, 1841-1845.  
King's Botanist, Edinburgh, 1845-1879.

A small collection was presented in 1893. His large personal herbarium is housed in the Perth Art Gallery and Museum.

*Flora of Edinburgh*, 1863.

\*BANKS, GEORGE H.

Superintendent, Glasgow Botanic Gardens.

Herbarium presented 1945. General.

c. 1,500 sheets.

\*BUCHANAN, ROBERT MACNEIL, M.B., Ch.B. (1861-1931).

b. High Finnick, Drymen. City (Glasgow) Bacteriologist.  
President, Royal College of Physicians and Surgeons.

Herbarium presented 1938. Plants chiefly of the western portion of v-c. 86 (Stirling).

Obit. notice, *Glas. Nat.* X. p. 73.

c. 1,500 sheets.

\*EWING, PETER, F.L.S. (1849-1913).

b. Kinross, d. Glasgow.

Cabinet-maker then Insurance Surveyor.

Obit. Notice, *Glas. Nat.*, V., p. 113.

Pres. N.H.S., Gw., 1902-1905. *Glasgow Catalogue*, 1892.

Herbarium presented 1951. A very complete and valuable collection of British plants, including many specimens collected by his wife (née Elizabeth Raymond Burden) who was also a very keen field botanist (Pres. N.H.S. Gw., 1919-1920). Scottish Arctic-Alpines form a special feature of this herbarium. The Breadalbane Mountains were intensively worked over. Ewing also specialised in the genus "Carex."

c. 3,500 sheets.

\*KIDSTON, ROBERT, LL.D., F.R.S., F.R.S.E., F.G.S. (1852-1924).

b. Bishopton House, Renf. d. Gilfachdach, Glam.

Palaeobotanist of world fame.

Pres. N.H.S. Gw., 1896-1899.

His herbarium contains that of Col. J. S. Stirling of Gargunnoch. Special feature, Scottish Arctic-Alpines. A very comprehensive collection of British plants. Vice-Counties 86 and 88 are very well represented.

c. 3,600 sheets.

\*LEE, JOHN RAMSAY, M.A.

Hon. Curator, Herbarium, Glasgow University.

Pres. N.H.S. Gw., 1911-1914 and 1930-1933. (See p. 107.)

c. 2,500 sheets.



\*MCGROUTHER, THOMAS, F.S.A.(Scot.) (1858-1941).

b. Falkirk. d. Larbert. Writer, Glasgow.

Herbarium presented 1944. General.

Obit. Notice, *Glas. Nat.* XIV., p. 101.

c. 500 sheets.

MATTHEWS, WILLIAM (1828-1901).

b. Hagley, Worc. d. Tunbridge Wells.

Sometime President of Alpine Club.

Herbarium presented 1901 from the Royal Gardens, Kew.

c. 150 sheets.

MOFFAT, ANDREW.

Herbarium presented 1934. Scottish.

c. 1,000 sheets.

\*NIELSON, G. B.

Botanist and Geologist. Associate of P. Ewing and A. Somerville.

c. 3,000 sheets.

\*PATTON, DONALD, M.A., B.Sc., Ph.D., F.R.S.E.

Hon. Curator, British Herbarium, Glasgow University.

Pres. N.H.S., Gw., 1926-1929 and 1952—

Herbarium presented 1949; special feature Scottish Arctic-Alpines. Comprehensive collection of British plants

c. 2,500 sheets.

\*RENNIE, WILLIAM.

Has been associated with the Glasgow Botany Dept. for a considerable number of years. He has contributed many interesting local plants as well as many specimens obtained when he attended the excursions of Section K (Botany) of the British Association.

Hon. Mem. G.U. Bot. Soc.

c. 800 sheets.

\*STIRLING, COL. J. STIRLING, of Gargunnoch.

d. 1900. See under Kidston.

\*SOMERVILLE, ALEXANDER, B.Sc., F.L.S. (1842-1907).

b. and d. Glasgow. Merchant (India).

Pres. N.H.S. Gw., 1899-1902.

“His herbarium . . . one of the finest in the country.”

*Trans. N.H.S., Gw.*, VIII (N.S.) p. 228.

c. 2,000 sheets.

TRINITY COLLEGE, GLASGOW.

Herbarium presented in 1931 by the Senate of the College. A most valuable collection. It contains many specimens from the herbaria of :—

John Ball.

G. S. Gibson.

J. Dickinson, M.D.

Wm. Gourlie, Jr.

H. C. Watson.

W. S. Hore, etc.



and many plants gathered by :—

Sir W. J. Hooker. Sir J. D. Hooker. Prof. R. Graham.  
Rev. A. C. Johns. Prof. C. C. Babington. G. Don.  
J. Backhouse. W. Borrer. W. Gardiner (Dundee),  
etc.

c. 3,000—4,000 sheets.

\*WISE, THOMAS (1854-1932).

b. Glasgow. d. Hamilton.

Pres. Andersonian Nat. Soc.

Herbarium presented 1949. A very good general collection.

Obit. Notice, *Glas. Nat.* XII, p. 32.

Over 2,000 sheets.

\*WISHART, R. S., M.A. (? - 1924).

Science-master, Glasgow High School for Boys.

Mem. N.H.S. Gw., then Hon. Mem. from 1914.

Herbarium presented 1926, mostly from v-c. 89.

c. 1,000 sheets.

WYLIE, Dr. JAMES (1849-1927).

Herbarium presented 1950. Generally Scottish ; mainly  
from v-c.'s 77 and 100.

c. 2,000 sheets.

In addition to the above herbaria there have been gifted  
to the Botany Department, from time to time, a large number  
of specimens from the herbaria of :—

ROBERTS, J. G. Presented 1932.

\*HILL, ALEXANDER. Presented 1941.

\*LUNAM, GEORGE.

Science-master, Glasgow. Algologist (Freshwater). Plants  
presented 1951—from the Breadalbanes, the Channel  
Islands and the Western Isles.

\*BROWN, ROBERT.

Westerton. d. 1949.

Herbarium presented 1951.

\*MACKECHNIE, ROBERT, B.Sc., A.L.S.(Hon.).

Science-master, Glasgow.

Specimens presented 1952, etc. Chiefly Scottish Arctic  
Alpines ; also Potamogetons.

It will be seen, from the dates on which the above herbaria,  
etc., were presented, that by far the larger part of the British  
Herbarium was amassed during Professor Walton's tenure of  
the Chair of Botany. He, himself, has added several hundreds  
of species, chiefly from vice-counties 92-97 and 25, 27 and 28.  
Professor Bower also made a considerable number of additions  
and Professor Claud W. Wardlaw, when he was on the Glasgow  
University Botany staff, put into the herbarium a large

number of specimens, mostly from his own vice-county—Renfrewshire (76).

Ecological surveys of specified regions have been a feature of the work of the Botany Dept.—carried out by the students (Honours) under the leadership of various members of the staff. The earliest, since the opening of the Botany Buildings in 1901, being the survey of certain localities of the Loch Lomond drainage area, carried out by the Floristic Committee of the G.U. Bot. Soc. under the guidance of Professor J. M. F. Drummond who was then a lecturer. Professor Walton conducted several surveys in the Cairngorms and on Speyside. The most recent has been the survey of the Beinn Eighe Reserve under the leadership of Mr. B. W. Ribbons. All these have added their quota to the herbarium. Special mention must be made of a large collection made during the expeditions to the Island of Canna arranged by Dr. Asprey during 1937 and subsequent years.

In addition to those botanists whose herbaria have already been mentioned, there are others whose specimens have found their way into the University British Herbarium. Thus there are several specimens—any number from two dozen to four dozen and over—from each of the following :—

\*BABINGTON, CHARLES CARDALE, F.R.S. (1808-1895).

Prof. Botany, Cambridge.

Hon. Mem. N.H.S., Gw. from 1888.

\*BACKHOUSE, JAMES, Jr., F.L.S. (1825-1890).

b. and d., York.

Corres. Mem. N.H.S., Gw.

BAKER, JOHN GILBERT, F.R.S. (1834-1920).

Classified genus "Rosa" for Hennebury's "Clydesdale Flora." Keeper Kew Herb. 1890-1899.

BALL, JOHN, F.R.S. (1818-1889).

b. Dublin. d. S. Kensington.

\*BALLOCH, R.

c. 1843.

BARCLAY, WILLIAM (1846-1923).

Schoolmaster.

Mem. Perth N.H.S.

BELL, REV. T.

c. 1837.

\*BENNETT, ARTHUR, F.L.S.

Croydon, Surrey.

Corres. Mem. N.H.S., Gw. from 1887.

BERRIE, ALEXANDER M. M., B.Sc., Ph.D.

Lecturer in Agric. Botany, Glas. Univ. (1950-1952).

Chiefly genus "Betula."

- BLACK, ALEXANDER OSMOND (? -1864).  
 Medical. Found *Alchemilla conjuncta* in Clova, 1853.
- BORRER, WILLIAM, F.L.S., F.R.S. (1781-1862).  
 Henfield, Sussex.
- BRAND, WILLIAM, W.S. (1807-1869).  
 b. Blackhouse, Peterhead.  
 Discovered *Astragalus alpinus*, 1830, in Clova.
- CAMPBELL, W. H., LL.D. (1814-1883).  
 b. Edinburgh. d. London.
- CHRISTY, W., F.L.S. (1807-1839).  
 b. Kingston-on-Thames. d. Clapham.
- \*CLELAND, DR. c. 1852.  
 Was a member of N.H.S., Gw., but went to reside in  
 Edinburgh where he took an active part in the Nat.  
 Hist. Soc., Edin.
- COUPER. c. 1853.
- CROALL, ALEXANDER (1809-1885).  
 Montrose. b. Brechin. d. Stirling.  
 Pres. Perth N.H.S.  
 Curator, Smith Institute, Stirling, 1873.
- DENNES, GEORGE EDGAR, F.L.S. (1817-1860 ?).  
 d. Australia.  
 Edited *London Catalogue of British Plants*. ed. i.
- DICKIE, GEORGE, M.A., M.D., F.R.S., F.L.S. (1812-1882).  
 Prof. Botany, Belfast, 1849; Aberdeen, 1860-1877.  
 Author of "The Botanist's Guide to the counties of  
 Aberdeen, Banff and Kincardine," 1860.
- DICKINSON, JOSEPH, M.D., F.R.S., F.L.S. (1805-1865).  
 Lecturer, Liverpool School of Medicine.  
*Flora of Liverpool*, 1851.
- DON, GEORGE (1764-1814).  
 b. Menmuir, Angus. d. Forfar.  
 Nurseryman, Doo Hillocks.
- FERGUSON, DANIEL, M.A.  
 Schoolmaster, Paisley. Specialised in local alien plants.  
 Pres. Paisley N.H.S. Mem. G.U. Bot. Soc. c. 1920.
- FOX, REV. HENRY ELLIOTT (1841-1926).  
 b. Masulipatam, S. India. d. Putney. Surgeon.
- FRASER, JOHN, M.D. (1820-1909).  
 b. Glasgow. d. Wolverhampton.  
 Hull University.
- FRASER, JOHN. c. 1912.  
 Worked on alien Flora, Leith Docks, etc.

- GARDINER, WILLIAM, A.L.S. (1808-1852).  
 b. and d. Dundee. Umbrella maker.  
 Author of "Flora of Forfar," 1848.
- GOODWIN, JOHN AND MARGARET.  
 Son and daughter of Dr. Goodwin, Glas. Univ., Chemistry  
 Dept.  
 Very fine collection from Barra, 1951.
- GORDON, REV. GEORGE (1801-1893).  
 Birnie. b. Urquhart. d. Braebirnie, Elgin.
- GORRIE, WILLIAM, c. 1838.  
 Edinburgh.
- \*GOURLIE, WILLIAM, Jun. (1815-1856).  
 b. Glasgow. d. Pollokshields, Glasgow.  
 First President of N.H.S., Gw., 1851-1854.
- GRAHAM, ROBERT, M.D. (1796-1845).  
 b. Stirling. d. Coldoch, Perthshire.  
 Prof. Botany, Glas. Univ., 1818-1820.
- GREVILLE, ROBERT KAYE, LL.D., F.R.S., F.R.S.E.  
 (1794-1866).  
 b. Bishop Auckland, Durham. d. Murrayfield, Edinburgh.  
*Flora Edinensis*, 1824. *Algae Britannicae*, 1830.
- \*GRIERSON, ROBERT ( — -1930).  
 b. and d. Dublin. Solicitor, Glasgow.  
 "Clyde Casuals" in *Glas. Nat.*, IX.
- GRIFFITHS, Miss C. M. c. 1842.
- GRINDON, LEOPOLD HARTLEY (1818-1904).  
 b. Bristol. d. Manchester.
- \*GROVES, HENRY, F.L.S., (1855-1912) and JAMES.  
 Herbarium contains duplicates from "Herbarium Groves-  
 ianum."  
 Corres. Mems. N.H.S., Gw. from 1900.
- HAGGART, D. H. c. 1892.  
 Killin. Banker.  
 Knew the Breadalbanes well—especially Ben Lawers.
- HALL, THOMAS BATT (1814-1886).  
 b. Coggieshall, Essex. d. Melbourne.  
 Author of "Flora of Liverpool."
- HAMILTON, GILBERT. c. 1912.  
 Symington, Lanarkshire, and Errol. Railwayman.  
 With Rev. J. Kerr, Kirkmuirhill, Rev. T. Whyte Paterson,  
 Midcalders, and Miss MacLennan, Sepham, Kent, formed  
 the "Sweet Gale Club" for exchange of specimens.  
 Mr. Kerr's herbarium is in the custody of the Glasgow  
 Art Gallery and Museum.



- HENSLOW, Rev. JOHN STEVENS, B.A., F.L.S. (1796-1861).  
 b. Rochester. d. Hitcham, Suffolk.  
 Prof. Botany, Cambridge.
- \*HOOKER, SIR JOSEPH DALTON, M.D., F.R.S., F.L.S., etc.  
 (1817-1911).  
 b. Holesworth, Suffolk. d. Sunningdale, Berks.  
 Hon. Mem. N.H.S., Gw. from 1887.
- HOOKER, SIR WILLIAM JACKSON, LL.D., F.R.S., F.L.S., etc.  
 (1785-1855).  
 b. Norwich. d. Kew.  
 Prof. Botany, Glasgow, 1820-1841.  
 First Director of Royal Botanic Gardens, Kew.  
 His personal herbarium which he amassed at Glasgow  
 formed the nucleus of the Kew Herbarium. Prof. F. O.  
 Bower writes, "For details of its contents and final  
 purchase by Government, see Sir William Hooker Sketch,  
 Annals of Botany, Vol. XVI. No. LXIV., Dec., 1902."
- HORE, Rev. WILLIAM STRONG, B.A., M.A., F.L.S. c. 1849.  
 b. Stonehouse, Plymouth. d. Barnstaple, Devon.  
 Vicar, Shebber, Devon.
- HOSKING, A. c. 1894.  
 Surrey. Cambridge Botanic Gardens.
- IBBOTSON, HENRY (1816-1886).  
 Schoolmaster, York.  
 Author of "A Catalogue of the Phænogamous Plants of  
 Great Britain," 1848.
- JOHNS, Rev. CHARLES ALEXANDER, B.A., F.L.S. (1811-  
 1874).  
 b. Plymouth. d. Winchester.  
 Author of "Flowers of the Field." 1853, etc.
- \*KIDSTON, ADRIAN M. M. G. c. 1878.  
 Helensburgh.
- \*KIDSTON, C. M. c. 1891.  
 Stirling.
- KIDSTON, M. A. M. c. 1883.  
 Stirling. Daughter of Dr. Robert Kidston.
- \*KING, THOMAS (1834-1896).  
 b. Lochwinnoch. d. Fochabers.  
 Prof. Botany, Andersonian University, Glasgow.  
 Pres. N.H.S., Gw., 1893-1896.
- KNAPP, Miss LYDIA M. c. 1836.  
 Alveston. Daughter of Rev. P. Knapp, Shenley, Bucks.
- LEE, P. Fox. c. 1886.  
 Dewsbury, Yorks.

- LEVINGE, HARRY CORBYN (1831-1896).  
d. Knockdrin Cas., Mullingar.
- \*LINTON, REV. EDWARD F. c. 1866.  
b. Diddington, Hants., d. Shirley, Derbyshire.  
Crymlyn, Bournemouth.  
Corres. Mem. N.H.S., Gw. from 1900.
- LINTON, REV. WILLIAM R. (1850-1908).  
Brother of E. F. Linton. Vicar of Shirley.  
Author of "Flora of Derby."
- LITTLE, REV. WILLIAM.
- LOMAX, ALBAN EDWARD (1861-1894).  
b. Liverpool. Druggist.
- \*LYON, GEORGE JASPER (1816-1862).  
Glasgow and Moffat.
- MACLENNAN, Miss. c. 1912.  
Sepham, Kent.
- MACNAB, GILBERT, M.D.(EDIN.) (1815-1859).  
b. Edinburgh. d. St. Ann, Jamaica.
- MACTIER, ANTHONY. c. 1891
- MEDLEY, BERTRAM A. c. 1919.  
Son of Prof. D. J. Medley (History) Glasgow University.  
(1899-1931).
- MORE, ALEXANDER GOODMAN, F.L.S. (1830-1895).  
b. London. d. Dublin.  
Curator, Nat. Hist. Mus., Dublin.
- NICHOL, WILLIAM, M.D.(EDIN.) 1857. (1836-1859).  
b. Edinburgh. d. Alexandria.
- NICHOLSON, GEORGE, F.L.S. (1847-1908).  
Tunbridge Wells. b. Ripon, d. Richmond, Surrey.  
Kew.
- PAINTER, REV. WILLIAM HUNT (1835-1910).  
b. Birmingham. d. Shrewsbury.  
Rector, Stinchley, 1894-1909.
- POWELL, JANE STEUART. c. 1836.  
Hanbury.
- \*RIBBONS, BASIL W., B.Sc., A.L.S.  
Lecturer, Glas. Univ. Bot. Dept.
- RIMINGTON, COL. c. 1890.
- RYLANDS, THOMAS G. (1818-1900).  
Warrington. Wire Manufacturer.
- SMALL, LILIAS (Mrs. Cyril Edwards).  
Glas. Univ. Bot. Dept. Staff. c. 1939.  
Chiefly specimens from v.c.'s 76 and 77.

- SMILLIE, EDITH. c 1941.  
Glas. Univ. Bot. Dept. Staff.
- SOPPIT, P. c. 1880.
- STABLES, WILLIAM ALEXANDER (1810-1890).  
b. Cullen. d. Calcots, Elgin.  
Factor, Cawdor Cas. A valuable collection.
- STARK, Miss I. c. 1831.
- STEUART, DAVID. c. 1800.  
Edinburgh.
- STURROCK, ABRAM. c. 1884.  
b. Padanaram, d. Rattray.  
Blairgowrie. Schoolmaster.  
Mem. Perth Soc. Nat.  
His herbarium is in Perth Art Gallery and Museum.
- SYME, JOHN THOMAS IRVINE, LL.D., F.L.S. (1822-1888).  
= J. T. I. Boswell.  
b. Edinburgh. d. Fife.
- TAYLOR, GEORGE, D.Sc.  
British Museum (Nat. Hist.), London.  
Mainly Potamogetons.
- THOMPSON, REV. J. H. c. 1885.
- TYNDALL, Mrs. E. M. c. 1890.  
Tunbridge Wells.
- TOZER, REV. JOHN SAVARY (1790-1836).  
Curate of St. Petrock, Exeter.
- TREVELYAN, SIR WALTER CALVERLEY, BART. (1797-1879).  
b. Newcastle-on-Tyne. d. Wallington, Northumberland.
- TUDOR, R. A. c. 1840.  
Bootle.
- WARD, JAMES (1802-1873).  
b. Wensley, Yorks. d. Manchester.
- WARD, NATHANIEL BAGSHAW, F.R.S., F.L.S. (1791-1868).  
b. London. d. St. Leonards, Sussex.
- WATSON, HEWETT COTTRELL (1804-1881).  
Thames Ditton, Surrey.  
Author of "Cybele Britannica," "Topographical Botany,"  
etc.
- \*WATT, LAWRENCE ALEXANDER (1850-1939).  
Staff of John Brown, Clydebank Shipyard.  
His herbarium was presented to Clydebank High School.  
Obit. Notice, "*Glas. Nat.*" XIV, p. 44. Specimens chiefly  
from v-c.'s 99 and 94.

- WHITE, FRANCIS WHITE BUCHANAN, M.D., F.L.S., etc.  
(1842-1894).  
b. Perth.  
Author of "Flora of Perthshire."
- WIGHT, Dr. ROBERT (1796-1872).  
b. Milton, Duncra Hill, Haddington. d. Grazeley, Berks.
- \*WILKIE, ROBERT. c. 1892.
- \*WILKIE, THOMAS. c. 1892.  
Glasgow. Plants mainly from v-c.'s 76, 77 and 100.
- WILSON, WILLIAM (1799-1871).  
b. and d. Warrington.  
A valuable contribution to the herbarium.
- 
- The specimens in the British Herbarium have been collected by over 900 individuals over 200 of whom are responsible for a single specimen each. It is interesting to note that the herbarium contains plants gathered by the following :—
- \*BOYD, D. A. (1855-1928).  
Pres. N.H.S., Gw., 1905-1908.
- \*BRAID, K. W., O.B.E., M.A., B.Sc., B.Sc.(Agric.), F.L.S.  
Prof. Botany, W. of Scotland Agric. College.  
Pres. N.H.S., Gw., 1949-1951.
- BRIGGS, T. R. ARCHER (1836-1891).  
Author of "Flora of Plymouth."
- DAVIE, ROBERT CHAPMAN, D.Sc. (1887-1918).  
Co-founder of Glas. Univ. Bot. Soc.  
Lecturer (Botany) in Glas. Univ. and Edinburgh Univ.
- DE CRESPIGNEY, EYRE (1821-1895).  
b. Switzerland. d. Beckenham, Kent.
- DICK, ROBERT (1811-1866).  
b. Tullibody, Clack. Naturalist. Baker. 1850-1931.
- DRUCE, GEORGE CLARIDGE, LL.D., M.A., D.Sc., F.R.S., F.L.S. 1850-1931.  
Pharmacist, Oxford : Mayor.  
Author of "The Comital Flora of the British Isles," etc.
- \*EDWARD, THOMAS, A.L.S. (1814-1886).  
b. Gosport, Hants. d. Banff.  
Shoemaker. See "Life of a Scottish Naturalist" by Samuel Smiles.  
Corres. Mem. N.H.S., Gw., 1867-1886.
- \*GWYNNE-VAUGHAN, DAVID THOMAS (1871-1915).  
Lecturer, Glas. Univ. Bot. Dept., 1896-1909.  
Prof. Botany, Belfast, 1909-1914, Reading, 1914-1915.



- \*HANBURY, FREDERICK J., F.R.S., F.L.S., etc.  
Sussex, Brockhurst, E. Grinstead.  
Corres. Mem. N.H.S., Gw. from 1895.
- HENNEDY, ROGER (1806-1876).  
b. Carrickfergus. d. Bothwell.  
Prof. Botany, Andersonian University, Glasgow.  
Author of "Clydesdale Flora." 1865.  
His herbarium is housed in the Royal Technical College,  
Glasgow.  
See Biography in Memorial Edition of "Clydesdale  
Flora."
- \*LANDSBOROUGH, REV. DAVID, D.D., A.L.S. (1779-1854).  
b. Dalry, Kirkeud. d. Saltcoats.  
Author "Popular History of Seaweeds," "Arran."
- \*LANDSBOROUGH, REV. DAVID, LL.D. (1826-1912).  
Kilmarnock. b. Stevenston.  
Corres. Mem. N.H.S., Gw. from 1887.
- \*LANG, WILLIAM H., M.B., D.Sc., LL.D., F.R.S.  
Formerly Lecturer, G.U. Bot. Dept.  
Emeritus Prof., Manchester University.
- \*LEES, EDWIN, F.L.S., F.G.S. (1800-1887).  
Worcester. Printer and Stationer.  
Corres. Mem. N.H.S., Gw. from 1871.
- LEIGHTON, REV. WM. ALLPORT, B.A., F.L.S. (1805-1889).  
b. Shrewsbury. d. Luciefield, Shrewsbury.  
Author of "Flora of Shropshire."
- \*McANDREW, JAMES (1836-1917).  
New Galloway. b. Spynie. d. Edinburgh.  
Schoolmaster.
- \*MACNAIR, PETER, F.G.S., F.R.S.E.  
Curator, Glasgow Art Gallery and Museum.
- \*MARSHALL, REV. EDWARD SHEABURN, M.A., F.L.S.  
(1838-1919). b. London. d. Tidenham, Glos.  
Vicar, Milford, Surrey.  
Corres. Mem. N.H.S., Gw. from 1900.
- \*MAIN, JOHN, M.B.E., F.G.S., F.E.I.S.  
Schoolmaster, Glasgow. Obit. Notice, "*Glas. Nat.*"  
XII, p. 130.
- PAMPLIN, WILLIAM, jun. (1806-1899).  
b. Wandsworth. d. Llandderfal.  
Bookseller and Publisher.
- PEACH, BENJAMIN N. c. 1882.  
Geological Survey of Great Britain.

- \*PRAEGER, ROBERT LLOYD, D.Sc., Sc.D., B.E., M.R.I.A.  
Dublin. Royal University of Ireland.  
Corres. Mem. N.H.S., Gw. from 1900.
- \*SHEARER, JOHNSTON (1827-1916).  
b. Aberdeen. d. Glasgow.  
See Article on *Ledum palustre*. *T.N.H.S. Gw.*, Vol. III  
(N.S.) p. 251.
- \*SMITH, JOHN (1846-1930).  
Dalry, Ayrshire. Geologist.  
Author of "Ayrshire Flora," etc.  
Corres. Mem. N.H.S., Gw. from 1879.
- SWORD, JAMES ( —1951).  
d. Luggiebank, Cumbernauld Station.  
Curator, Smith Institute, Stirling.  
Friend of Dr. Kidston, A. Croall, etc.
- \*TRAILL, JAMES WILLIAM HELENUS, F.R.S. (1851-1919).  
b. Birsay, Orkney. d. Aberdeen.  
Prof. Botany, Aberdeen University.  
Author of "Flora of Buchan," etc.  
Corres. Mem. N.H.S., Gw. from 1888.
- \*TURNER, ROBERT (1848-1894).  
b. Strathaven. d. Glasgow.  
Pres. A.N.S., Gw., 1890-1892.
- VACHELL, ELEANOR, F.L.S. c. 1918.  
Cardiff.  
Her herbarium was bequeathed to the Nat. Mus., Wales.
- \*WHITTON, JAMES, M.V.H. (1871-1926).  
b. Methven, Perthshire.  
Superintendent, Glasgow's Public Parks and Botanic  
Gardens.
- \*WILSON, REV. ALEXANDER STODDART, M.A., B.Sc. (1854-1909).  
Lecturer in Botany, Anderson's College, Glasgow. From  
his Botany Class the Andersonian Naturalists' Society  
originated—First President, 1885-1890.  
Free Church Minister, North Queensferry 1881-1909.  
Obit. Notice, "*Glas. Nat.*," Vol. I, page 61.

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In concluding this portion of the Address it is of no small interest to us, as a Society, to note that at least 80 contributors to the herbarium are, or have been, members of the Natural History Society of Glasgow, The Andersonian Naturalists' Society and/or the present Society.

The following are the oldest specimens in the British Herbarium :—

1786. *Lycopus europaeus* Linn., from Goodwood, v-c, 13.  
 1787. *Veronica hybrida* Linn., from Goodwood.  
*Salvia Verbenaca* Linn., from Selsea, v-c. 13.  
 1788. *Anthemus tinctoria* Linn., coll. by G. Don.  
*Veronica agrestis* Linn., from Goodwood.  
 1789. *Bartsia alpina* Linn., coll. by G. Don on Maelghyrdy.

The herbarium contains several type specimens. To begin with there is the set of the British "Rubi," compiled by Moyle Roger. As to the others it is very interesting to compare the remarks in "The First Records of British Flowering Plants" by William A. Clarke, F.L.S. (d/- 1900) with those on the herbarium sheets. Thus in Clarke we read :—

*Astragalus alpinus* Linn.

"Found 30 July, 1831, by Mr. Brand, Dr. Greville and Dr. Graham in Glen of the Dole, Clova. E. B. Suppl." (Supplement to English Botany by Sir J. E. Smith and James Sowerby.) "2717." p. 40. Druce repeats this in his "Comital Flora." 1932, p. 87.

In the herbarium is a specimen with the caption "2 Aug. 1830, from Mr. Brand the discoverer." This specimen is from the collection of William Stables, Cawdor; and, again, on another sheet, "Elevated dry rocks on the south side of Glen Dole, 2.8.1830."

*Oxytropus campestris* DC.

Clarke, p. 41. "Discovered by Mr. G. Don in the summer of 1812. E.B. 2522."

The label on the sheet says: "I discovered this truly beautiful species, new to Britain, on a rock on the Clova Mountains in July 1812. G. Don."

*Ononis reclinata* Linn.

Four specimens in herbarium with these notes :—

- (1) "Ex Herb. J. H. Balfour.  
 Steep bank close to the sea about 2 miles north from Tarbet, Galloway.  
 Aug. 5. 1835."
- (2) "Raised by Mr. Balfour from seed picked at Mull of Galloway 5.8.1835."
- (3) "Galloway, Aug. 1835.  
 From Professor Graham, Edin. 17.11.1838."
- (4) "Galloway 1835. R. M. Stark."

Clarke's record reads :—

“ Found in Aug. 1835 by Prof. Graham by the Sea to the north of W. Tarbet, near the Mull of Galloway.” (Co. Wigtown). Hook. Comp. Bot. Mag. 1. 119.

*Trifolium striatum* Linn.

“ Near the Lizard.

July 1, 1847. Rev. C. A. Johns.”

Clarke says :—

“ Found in July 1847 by Rev. C. A. Johns ‘ between the Lizard Head and Kynance Cove.’ Phytol. ii. 908.”

*Epilobium pedunculare* A. Cunn.

Ardrishaig (v-c. 101) collected by Peter Ewing, May, 1911.

*Pinguicula alpina* Linn.

Clarke (p. 110 says : “ Picked by the Rev. George Gordon in June 1831, in the bogs of Auchterflow and Shannon, Ross-shire . . . E. B. Suppl. 2747.”

Mr. Stables comments on this species on one sheet, “ Raddery Moss, Ross-shire, opposite Fort George, received from Geo. Gordon, Elgin, June 1831—the original discoverer.”

*Carex rupestris* All.

Herbarium specimen “ Glen Callater Braemar, 2 Aug. 1836. George Dickie.” “ New to British Flora.” Dickie in his “ Botanist's Guide to the Counties of Aberdeen, Banff and Kincardine ” says :—

“ At the waterfall, Glen Callater. On August 2, 1836, this plant was added to the British list, a few specimens having been picked at that date. Some days afterwards when in company with my friend Dr. Templeton, it was found in great profusion.”

Clarke, p. 162 says, “ Discovered by Dr. Dickie and Mr. Templeton in Aberdeenshire—Hook. Comp. Bot. Mag. ii, 191. Found Aug. 2nd, 1836. Note on E.B. drawing.”

*Carex Halleri* Gunn.

On herbarium sheet “ Head of Glen Callader, Aug. 1830. R. K. G.” *i.e.* R. K. Greville.

Clarke records, p. 165. “ Discovered in 1830 by Prof. Balfour and Dr. Greville among some precipitous rocks which surround a small loch above two miles from Loch Callader. E. B. Suppl. 2666 (C. VahlIIi).”



By going systematically through the specimens in a herbarium one learns a great deal about the changes which have taken place in our Flora. Plants are here which no longer grow in Britain. *Eriophorum alpinum* which once flourished on Restenet Moor, Angus, no longer exists except in the herbarium. *Pinguicula alpina*, once abundant in the Black Isle, has also disappeared. *Schoenus ferrugineus* which used to luxuriate by Loch Tummel is now in a precarious position.

Man's interference with Nature often exterminates species locally. *Linnaea borealis*, added to the herbarium as recently as this summer, from an old Scots Pine stand at Rachan House, Broughton, Peebleshire, and, I think, not hitherto recorded from this vice-county, will probably disappear. The house, I understand, is being demolished and the timber is sold.

Natural causes also are at work changing the Flora of the country.

The herbarium has ample evidence that the place, which once knew an interesting species, knows it no more. In many cases rapacious collectors have been to blame; but the far flung new (and older) housing schemes have played their part. Henney's "Clydesdale Flora" gives verbal evidence of this. Here are some illustrations from the herbarium.

*Scrophularia aquatica* Linn.

Somerset Place—Site of, Sauchiehall Street, Glasgow,  
7 July, 1841.

*Aethusa Cynapium* Linn.

Waste ground, W. George Street, Glasgow, 20 Aug.  
1840.

*Sherardia arvensis* Linn.

New City Road, Glasgow. June 1840.

The perusal of the sheets in a herbarium reveals some of the idiosyncrasies of the collectors. Several of the contributors were chemists or druggists; so it is not surprising to find that the label on the sheet is similar to the one put on the medicine bottle. Dr. Druce's, *e.g.*, appear on several sheets of his specimens.

Professor Walker Arnott affixed to one of his sheets a small folder containing seeds. This folder once came from the chemist's, for on it is printed: "The Powder as directed."

Some botanists in the old days were inveterate plant collectors. Vide sheets of *Pyrola* (*Monesis*) *uniflora*, from Scone. This is also brought home by the remarks on the specimen sheets:—

*Bartsia alpina* Linn.

"Meal-rouchlar, a mountain in Glen Lochy about nine miles from Killin. Discovered by . . . and . . . 19th July, 1841. 120 specimens gathered."

*Ophrys muscifera* Huds.

"I could not get another or you should have had it. . . . 3 June, 1837."

*Carex vaginata* Tausch.

"On Craig Chaillach, 25 July, 1849, I saw it . . . but only two very bad specimens were collected. There were some fine ones on an inaccessible ledge."

These, no doubt, refer to the bad old days.

But there is a brighter side. In the appendix to "The Student's Flora of the British Isles" by Sir J. D. Hooker, reference is made to George Don's "reputed discoveries." Now, another of these has been re-discovered. To quote from B. W. Ribbons in "Watsonia" ii., iv., p. 237, "*Hypogyne alpina* (L.) Cass. was found in August, 1951, in the parish of Cortachy and Clova by A. A. P. Slack"—one of our members. A specimen has been presented to the herbarium. Again, for two centuries the Scottish Highlands have been visited by botanists. One might have expected that it was not possible to discover a new species; yet, a new (to Britain) genus, *Diapensia* has been recorded. *Diapensia lapponica* was discovered in Glen Finnan and a specimen reposes in the herbarium.

It is impossible in this age of Genus and Species splitting to assess, with any sure degree of accuracy, the number of British plants not yet gathered in to the herbarium. Perhaps Professor Bower's estimate for the flap-case collection, of 5% blanks, may not be far out.

As one would expect, this British Herbarium in actual number of sheets is predominantly Scottish; but, where the individual species are concerned, it is very representative of the British Flora as a whole.

## B. THE BRYOPHYTE HERBARIUM.

(Contributed by Mr. A. C. Crundwell, B.A., Lecturer, Glas. Univ. Bot. Dept.)

The herbarium contains about 20,000 specimens of British bryophytes. As with the vascular plants, it began with the acquisition of the collection of Professor Walker Arnott, which

included those of J. Brodie, D. Steuart and W. Nichol. The collection of W. Gourlie may have been acquired in the same way. Since then the collections of the following Scottish bryologists have been presented to the University by themselves or their heirs :—

T. LYLE, M.D. (Glasgow), 1792-1859.

\*REV. D. LILLIE (1854-1940), Minister in Caithness.

R. D. WILKIE, A. MOFFAT, R. KIDSTON, T. WISE,

\*P. EWING, \*J. R. LEE.

\* Their collections are particularly fine ; and taken together they have more than doubled the size and usefulness of the herbarium.

The herbarium also contains the following exsiccatae, presented and purchased at various times :—

BRAITHWAITE, ROBERT, M.D., F.L.S. (1824-1917).

b. Whitby. d. Brixton.

His *Sphagnaceae Britannicae*.

DON, GEORGE.

His *Herbarium Britannicum* including mosses.

DRUMMOND, THOMAS, A.L.S. d. 1835.

b. Scotland. d. Havana, Cuba.

His *Musci Scotici*.

He succeeded G. Don in nursery at Forfar.

HOBSON, EDWARD (1782-1830).

b. Manchester. d. Bowden, Cheshire.

Pres. Lancashire Botanists.

His *Musci Britannici*.

HOWIE, CHARLES (1811-1889).

d. St. Andrews. Nurseryman and Seedsman.

His *Musci Fifenses*.

Many specimens, too, have been added from time to time by Professor Walton and others.

The vast majority of the specimens were gathered in the Glasgow district or in the Highlands of Scotland, but nevertheless there are very few British species not represented in the herbarium by several specimens. There are also specimens gathered by all the more important British bryologists of the last 150 years.



## C. THE HERBARIUM OF BRITISH ALGAE.

(Contributed by Dr. Conway, Lecturer, Glas. Univ. Bot. Dept.)

The Algae Herbarium, predominantly marine in constitution, consists of some 1,700 sheets of specimens in the following groups :—

|                   |     |     |             |
|-------------------|-----|-----|-------------|
| Chlorophyceae     | ... | ... | 220 sheets. |
| Bacillariophyceae | ... | ... | 125 "       |
| Phaeophyceae      | ... | ... | 410 "       |
| Rhodophyceae      | ... | ... | 790 "       |
| Cyanophyceae      | ... | ... | 150 "       |

These are classified according to Newton's *Handbook of the British Seaweeds* (1931), and the fewer freshwater genera are classified as in West and Fritsch *British Freshwater Algae* (1927). Among the genera most fully represented are *Cladophora* with 82 sheets, *Polysiphonia* with 81 sheets and *Ceramium* with 64 sheets.

As in the case of the Flowering Plants, the collection of British Algae is based on the herbarium of G. A. Walker Arnott. In the 1930's important additions were made from the Andrew Moffat collection and from the herbarium presented by the Senate of Trinity College, Glasgow. Very recent collections now being incorporated into the herbarium are a collection from Fair Isle, N.B., made by Conway et al. in 1952, and another from County Clare and County Galway made by the same party in 1953.

Many of the names of collectors on the herbarium sheets are those now famous in phycological literature.

DAWSON TURNER (1775-1858), a banker of Yarmouth Antiquary. Author of *British Fuci* (1802).

JAMES SOWERBY (1757-1822), botanical artist and author of *English Botany*. Some of the specimens bearing his name are marked as being those which he used in drawing the plates describing *Ulva* and *Fucus* in *English Botany*.

REV. DAVID LANDBOROUGH (1779-1854).

Mrs. AMELIA WARREN GRIFFITHS (1768-1858) of Torquay. Harvey spoke of her as "the facile regina of British Algologists," and dedicated his *Manual of the British Marine Algae* to her, 1841. C. A. Agardh honoured her with the genus *Griffithsia*. Prolific collector on Devon shores.

DR. ROBERT KAYE GREVILLE (1794-1866).

PROFESSOR WILLIAM HENRY HARVEY (1811-1866). Prof. Bot., Dublin. *Manual of British Algae*, 1841. *Phycologia Britannica*, 1846-51.

REV. CHARLES CLOUSTON (1800-1885) and REV. Mr. LAING. Collectors in the Orkneys.



Mrs. MARGARET GATTY (1809-1873). *British Seaweeds*, 1863.  
Mother of the authoress, Julia Ewing.

PROFESSOR ROGER HENNEDY (1809-1877).

Many of the older collections of algae are in excellent condition. In 1846, John Ralfs sent from Penzance to Walker Arnott three specimens of freshwater Desmids floated out on to small squares of silk ; even to-day, the cells in the specimens are perfectly recognisable. Ralfs' *British Desmidiaceae*, 1848, which is in the Botanical Library of the University, has Walker Arnott's name inscribed on it by the author.

Among the treasures of this Herbarium are five volumes of dried algae specimens. One was produced in Edinburgh in 1826 by James Chalmers, a "manipulator" in W. J. Hooker's herbarium at Glasgow. The other four are volumes of *Algae Danmoniensis* (1833-6), seaweeds of South Devon, prepared and sold by Mrs. Mary Wyatt, dealer in Shells. The naming of the specimens was supervised by Mrs. Griffiths. The last two volumes are dedicated to "Their Royal Highnesses, the Duchess of Kent and the Princess Victoria." A supplement, not in our Herbarium, was issued in 1841.

#### APPENDIX.

GLASGOW UNIVERSITY ... BOTANY DEPARTMENT.

##### Professors.

|      |     |  |
|------|-----|--|
| 1818 | ... | ROBERT GRAHAM, M.D.                        |
| 1820 | ... | Sir W. J. HOOKER, LL.D.                    |
| 1841 | ... | JOHN H. BALFOUR, M.D.                      |
| 1845 | ... | G. A. WALKER ARNOTT, LL.D.                 |
| 1868 | ... | ALEXANDER DICKSON, M.D.                    |
| 1879 | ... | I. B. BALFOUR, M.D., D.Sc.                 |
| 1885 | ... | FREDERICK O. BOWER, Sc.D., LL.D., F.R.S.   |
| 1925 | ... | J. M. F. DRUMMOND, M.A.                    |
| 1930 | ... | JOHN WALTON, Sc.D., D.Sc., LL.D., F.R.S.E. |

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"A Biographical Index of Deceased British and Irish Botanists."  
2nd ed., 1931. Edit. A. B. Rendle.

CLARKE, WILLIAM A., F.L.S.

"First Records of British Flowering Plants." 2 ed., 1900.

"COLLECTANEA FOR A FLORA OF MORAY."

Printed by Alex. Russell, Courant Office, Elgin, 1839.

GLASGOW UNIVERSITY CALENDAR, 1922-1923.

NATURAL HISTORY SOCIETY OF GLASGOW.

1st Series—Proceedings, Vols. I-V, 1858-1883.

2nd Series—Proc. and Trans., Vols. I-VIII, 1883-1908.

3rd Series—"The Glasgow Naturalist," Vols. I-XVII, 1908-1952.

WALTON, J.

In "Fortuna Domus," Glas. Univ. Press, 1952. Chapter on  
"Natural History."

# Dr. JAMES CARGILL—an early Aberdeen Botanist

By K. W. BRAID, O.B.E., M.A., B.Sc., B.Sc.(Agric.), F.L.S.

(Read 8th December, 1953)

On 8th May 1951, by invitation of Professor John Walton, the Glasgow and Andersonian Natural History and Microscopical Society attended a meeting of the Glasgow University Botanical Society to hear a lecture on "Early British Botanists," by Canon C. E. Raven, D.D., D.Sc., F.R.S., of Cambridge. After dealing with William Turner (1508-1568) and his *Herball* and mentioning the lost drawings of alpine plants of his friend Konrad Gesner of Zurich, he passed on to De l'Obel, botanist to James I. and VI. in London. Both Gesner and De l'Obel were in correspondence with the still more renowned botanists, Jean and Caspar Bauhin, in Switzerland. A doctor, James Cargill from Aberdeen, had visited De l'Obel in London and showed him a grass which was hitherto unknown in the vicinity of London. Also in 1603, he had sent him what was presumed to be *Narthecium ossifragum*, the first recorded specimens of *Triantalis europæa*, and at least four other plants and some seaweeds—all of which Bauhin noted in his *Prodromus* (1620).<sup>\*</sup> Canon Raven said that he was anxious to have more information regarding James Cargill, but that so far he had not been very successful, and he expressed the hope that if any one present could find out anything relating to this Scottish doctor, he would communicate with him.

About that time one of our Vice-Presidents—Mr. James Anderson—lent the writer Watt's *A History of Aberdeen and Banff*,<sup>†</sup> where reference is made to the famous family: the father, Thomas, and his two more illustrious sons James, a doctor, and Thomas, "Maister of the Grammar School." This led to an investigation into *Bibliographia Aberdonensis* (1472-1640)<sup>‡</sup> where further details were given. In brief, James Cargill (c. 1565-1615) studied under Professor Caspar Bauhin in Basle and took his medical doctor's degree there, by means of a thesis in 1594. Three years later he married Bauhin's sister. It may be that as a prominent citizen of Aberdeen, and a generous contributor to its university, he was in London in 1603 on state business and that precious specimens were more easily transmitted to Basle through the King's botanist, but doubtless he was also in direct communication with his famous brother-in-law. In any case, Cargill practised as a physician in Aberdeen until his death in 1615, and is still honourably remembered by his important foundations for the

benefit of poor scholars in the Grammar School and the University.

My hearty thanks are extended to Miss P. Woodland. Her excellent minute of the lecture alone made possible the reconstruction of the story and presentation of a report to Canon Raven.

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- \* Bauhin, Caspar, 1620. "*Prodomus*." Basle, p. 154.
- † Watt, William, 1900. "*A History of Aberdeen and Banff*." Blackwood, Edinburgh and London, pp. 185, 192, etc.
- ‡ Johnstone, J. F. K. and Robertson, A. W., 1929. "*Bibliographia Aberdonensis, 1472-1640*." Printed for the Third Spalding Club, Aberdeen, pp. 92, 98.

## ON THE SITUATION AND GEOLOGICAL STRUCTURE OF THE GARVELLOCH ISLANDS

By W. RUSSELL HUNTER, B.Sc., Ph.D., F.G.S. and DAVID A.  
MUIR, B.Sc.

(Received June, 1954)

Most of the smaller islands of the Hebrides lack calcareous rocks, and provide as a result rather acid and consequently relatively infertile soils as an environment for plants and animals. "Lime-hunger" is so characteristic a feature, that the most fertile lands in the Hebrides are the narrow strips of *machair* above the western beaches of certain islands. Here the Atlantic has piled up sand, the abundant shell-fragments of which have provided lime, and there result belts of light fertile soils. Extensive outcrops of limestone do occur in a few islands, and one example familiar to naturalists is the island of Lismore, lying close inshore in Loch Linnhe. Further offshore, the Garvelloch\* Islands (or Isles of the Sea) are less accessible and have not been studied extensively. In the summer of 1949, small expeditions, drawn mainly from Glasgow University, lived and worked, during four days in early June and sixteen days in July and August, on these otherwise uninhabited islands. The present series of papers results from collections and observations made then: a survey of the molluscs (Hunter, 1953), and another short note (Hunter, 1951) have already been published elsewhere; notes on insects (Muir, 1954), birds (Dunn, Hunter and Dunn, 1954), and general ecology (Hunter, 1954) follow this outline of the situation and geology of the islands.

The Garvelloch group lie where the Firth of Lorne opens out to the Atlantic Ocean, around lat.  $56^{\circ} 14' N.$  and long.  $5^{\circ} 47' W.$ , over six miles from the mainland (less than two miles from other small islands.) They are small, the whole group barely totalling one square mile in area. They are exposed to the ocean to the west and only occasionally visited by man. The two largest islands, Garbh Eileach (310 acres, see Map II.) and Eileach an Naoimh (200 acres, see Figs 7 and 10), are each about a mile and a quarter long. Two other islands, A'Chuli and Dun Chonnuill (Fig. 3), are both just under half a mile in length. Smaller islets range in size from those two hundred yards long which support considerable vegetation, down to mere rocks fifty feet across. In all, the archipelago numbers over twenty islands, islets and skerries.

Earlier published work on the geology of the Garvelloch is summarized in the appropriate survey memoir (Peach, Kynaston and Muff, 1909), while some references are made

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\* This spelling has been adopted throughout, see Hunter (1953).



in the memoir on Knapdale and Jura (Peach, Wilson, Hill, Bailey and Grabham, 1911). In the following account, part of the nomenclature of the former memoir is adopted; but it should be noted that the greater part of our observations

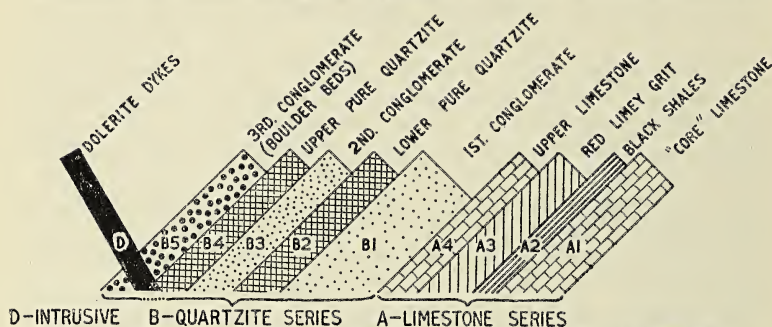


Fig. 1—The types of rock which occur in the Garvelloch Islands.

was made on the largest island, Garbh Eileach, and, where not otherwise stated, detailed notes on succession apply to that island, although most of the major structures described are common to the group. The rocks are almost all metamorphosed sediments of uncertain age and fall into the two main series summarized below:

B. Quartzite series, the upper group of strata, consisting of pure quartzites alternating with beds of conglomerate (the uppermost of which has massive inclusions forming a "boulder-bed") with some thin bands of sandy limestone interbedded.

A. Limestone series, the lower group of strata, consisting of creamy dolomitic limestones and a red calcareous grit, with some grey and black calcareous slaty beds.

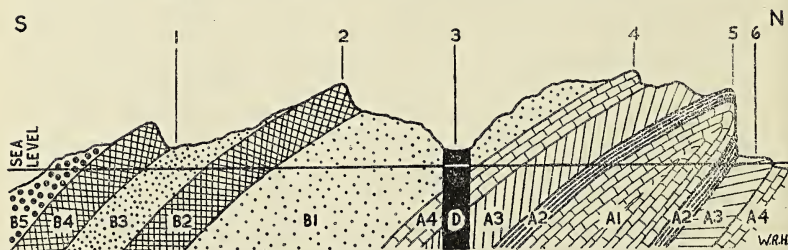


Fig. 2—Section through Garbh Eileach from south to north, to show geological structure. (Numbered features: 1, the valley Bealach a'Bhata; 2, the ridge of Sgurr Alasdair; 3, the pass Bealach an Tarabairt; 4, the ridge of Sgurr Mhic Coinnich; 5, the western cliff; 6, the "thirty-foot" ledge.)

The "core" limestone (A1 in Figs 1 and 2) is a fine-grained mottled grey-pink marble weathering to a dark yellow, compact but with evident bedding planes, and over fifty feet in



3—The northernmost of the Isles of the Sea—Dun Chonnuill, from the main island, Garbh Eileach.



Fig. 4—Shags nesting on the western cliff of A'Chuli, Garvelloch Islands.





Fig. 5—Limestone scenery : looking north over the highest ridges on Garbh Eileach.

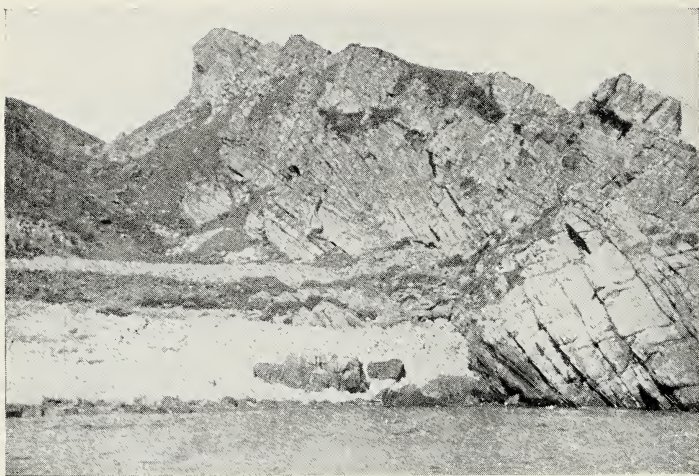


Fig. 6—Quartzite scenery : on the shore near the southernmost point of Garbh Eileach; minor thrusts occur in the quartzite beds here.



Fig. 7—The island of A'Chuli from the southern cliffs of Garbh Eileach : beyond lies Eileach an Naoimh (the Holy Isle).



Fig. 8—Glacial gougings on shore-rocks, Garbh Eileach.





**Fig. 9—Bealach an Tarabairt, the Atlantic end of a gorge eroded through the cliffs.**



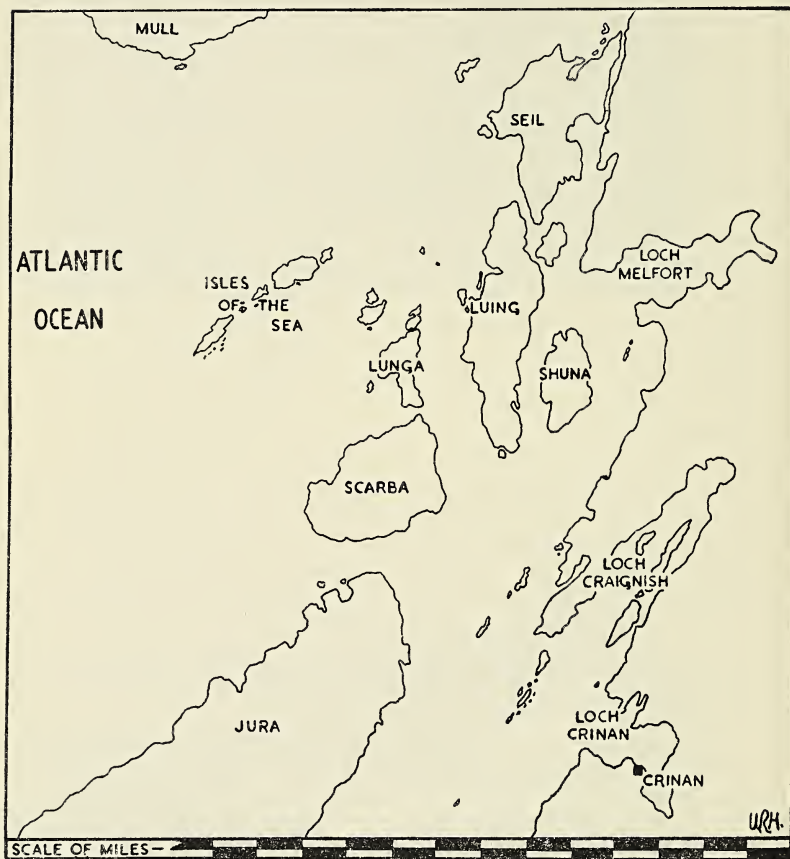
**Fig. 10—The Holy Isle, Eileach an Naoimh, and the southern skerries from A'Chuli.**

thickness in the unfolded condition. This is overlain by the "black shales" (A 2), which vary along the strike, both in thickness and in degree of metamorphosis and texture from near-phyllite to slate. In some exposures they contain very large cubic "crystals" (up to 8 ccs.) of iron pyrites. The calcareous grit (A 3) above these is thickest in the northern islands (up to near fifty feet), and probably contains amounts of ferrous iron since, though yellow-grey when freshly fractured, it quickly weathers to a characteristic rusty red. This is overlain by the upper limestone (A 4) which, though less thick and apparently less metamorphosed, closely resembles A 1. It may not be so distinct in the southern islands. Apart from some beds of sandy limestones (not shown in Fig 2), the matrix of the series of beds (B 1 - B 5) is generally quartzitic. At two horizons (B 2 and B 4) in Garbh Eileach the beds are free of inclusions (the "pure quartzites" of Figs. 1 and 2). The bulk of the rocks in this series contain inclusions of varying size and origin. In the lowest conglomerate (B 1) much of the included material consists of blocks and fragments of limestone, clearly derived from the underlying series (*i.e.* from A 4 or A 1). This provides further evidence that the Limestone Series is of greater age than the Quartzite Series, thus substantiating the relationship suggested by their stratigraphy. Generally, the upper beds of the Quartzite Series contain fewer but more massive inclusions (boulders of three feet in diameter occur in B 5), which include rock types foreign to the islands. Among these extraneous boulders are represented: granites, syenites (many of Nordmarkite type), felsites, jasper and schists. The beds of both limestone and quartzite series appear to be conformable in most outcrops, minor faulting and thrusting however, has been noted particularly in beds B 4 and B 5 of the quartzite series. (Thrusts in B 4 are shown in Fig. 6.)

The intrusive rocks of the area, which are of later age than all the metamorphosed sediments, consist of dykes falling into two series, both of which have the same trend (NNE - SSW). the first set (probably Lower O.R.S. in age), consists of relatively thin dykes of red porphyritic material, containing small phenocrysts of quartz and altered felspar in a felsitic groundmass. More common are dykes of basalt and dolerite, evidently belonging to the Mull Tertiary swarm, of which at least six traverse Garbh Eileach.

The two series of metamorphosed sediments lie in a single great recumbent fold whose axis trends from SW to NE, that is along the line of islands Eileach an Naoimh to Dun Chonnuill. The core of the fold is the limestone A 1, and the western and northwestern cliffs throughout the group have been cut

by sea against this core. Outcrops of the inverted beds from the underside of the recumbent fold only occur below the cliffs on the northwestern shores of Garbh Eileach and Dun Chonnuill (*i.e.* at the extreme right in Fig. 2). The axis of the fold is itself bent in a shallow arc, so that the outcrop of the basal limestone does not run in a straight line SW to NE,



Map I: LORNE AND THE ISLANDS.

but in a shallow curve, the concave side of which lies towards the mainland in the south-east. This arc in the outcrops is shown in the trend of the "crests" of the islands in Fig. 7, and by the line of the western shores of the group in Map I. The youngest rocks, the boulder beds of the quartzite series, outcrop on the south-east coasts of the main islands and in the skerries. As shown in many of the figures, the







islands generally slope down to the south-east from the top of the western cliffs, down the dip slope of the rock beds. Differential erosion has produced a series of cuesta-like ridges which traverse the islands at right angles to the dip slope (see Fig. 2), that is, the ridges run parallel to the long axes of the islands. On Garbh Eileach, the upper limestone (A 4) and those quartzite beds which lack inclusions (B 2 and B 4) are more resistant to erosion than the other beds and result in the typical scarps or cuestas of Figs. 6, 7, and 10. The valleys between them, with a correspondingly asymmetric section, are typified by Bealach a' Bhata (Fig. 6). The basalt and dolerite dykes, which traverse the islands at right angles to the outcrops of the other rocks (*i.e.* running NW to SE), are also of importance in determining the relief of the Garvelloch group. They, along with the altered and often slightly faulted rocks on their flanks, have been eroded more rapidly than the rest of the rock-structure in most cases. The principal transverse passes across the islands are the result of such weathering-out; the cross valley Bealach an Tarabairt on Garbh Eileach (Fig. 9, see also Fig. 2) being a notch from which the intrusive rock has been eroded in this way, running right through the western cliffs.

To sum up: the distinctive scenic features of the Isles of the Sea, the cliffs facing north-west and more gentle slopes to the south-east, the alternation of long ridges and valleys all running parallel to the long axis of the group, and the narrow gorges cutting across the islands from sea to sea—these features all result directly from the *solid* geology. However, some minor erosional features are very marked. Besides the great cliffs to the west and north, differential *marine* erosion is demonstrated in caves, blow-holes (notably on A'Chuli), and natural arches (on Eileach an Naoimh). Raised platforms of former marine erosion (particularly those of the "thirty-foot raised beach") are obvious on all of the islands (see Figs 3, 7 and 10), and in some cases are associated with the occurrence of "fossil" bivalve borings. A preliminary account of these borings has already been given (Hunter, 1951), and it is hoped to publish a more detailed analysis. Evidence of *glacial* erosion is also abundant. Glacial striae or gougings trending to the WSW are numerous and well-defined on the shores and quartzite ridges (see Fig. 8), while the skerries and off-shore tidal reefs all show the smoothly rounded "whale-back" form which results from recent ice-sculpture.

To the 1949 expedition the soil-types which lie over these rock-structures were of major significance. The greater part of the rocks which outcrop is calcareous and the highest

ridges on each island, lying immediately above the cliffs, are of limestone, so that drainage from these ridges produces alkaline soils on the lower slopes, even where the rocks beneath the soils are themselves non-calcareous (Hunter, 1953). Water samples of such drainage on Garbh Eileach gave values of 36.3 mg. of calcium per litre and *pH* value of 8.4. This may be contrasted with the waters of a hill loch in the adjacent island of Jura, with 2.16 mg. of calcium per litre, and *pH* 5.0. The acidic soils of most of the Highlands and Islands of Scotland bring about an inhibition of bacterial decay which results in peat formation. The soil alkalinity in the Isles of the Sea allows the formation of a rich black "mull" in many parts of the group, and this in turn supports an unusually rich vegetation. In general, the Garvelloch are not the brown or purple islands so typical of the Western Isles, but are surprisingly verdant.

Acknowledgments on behalf of the expedition are made elsewhere, but at present the authors wish to record their thanks to their companions, and to Myra Russell Hunter for help in the preparation of this paper.

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## A NOTE ON INSECTS FROM THE GARVELLOCH ISLANDS

By DAVID A. MUIR, B.Sc.

(Received June, 1954)

This paper, one of a series resulting from observations made during the 1949 expedition to the Garvelloch Islands (see Hunter and Muir, 1954), does not attempt a comprehensive survey of the insect fauna, but merely lists and comments upon collections of two groups: Macro-Lepidoptera (collected mainly by A. R. Macdonald) and Formicidae. The collections were made between 18th July and 1st August, 1949.

### PIERIDAE:

*Pieris napi* L. (Green-veined White). These have the distinct markings of typical Scots specimens, but show in a few cases exceptionally bright yellow pigment on the underside, which is characteristic of Irish specimens.

### SATYRIDAE:

*Maniola jurtina* L. (Meadow Brown). These are mainly subspecies *jurtina* L., but some specimens trend towards subspecies *splendida* White, with marked spreading of the post-ocellar halfband, and are probably intermediate forms.

*Eumenis semele* Hubner (Grayling). While some individuals show decidedly light bands on the underside of the hindwings, insufficient were collected to permit any conclusion regarding the alleged connection between wing colour and soil type (Ford, 1945).

*Aphantopus hyperanthus* L. (Ringlet). The presence of this species, typical of woodland and meadow, is an additional indication of the fertile nature of the islands. Ford (1945) states that it is absent from N. Scotland and the Isles.

### LYCAENIDAE:

*Polyommatus icarus* Rott (Common Blue). Normal form.

### ZYGAENIDAE:

*Zygaena filipendulae* L. (Six-spot Burnet). Normal form.

### ARCTIIDAE:

*Hipocrita jacobaeae* L. (Cinnabar). Normal form. Beirne (1947) mentions the last three species as being characteristic of coastal sand-dunes and also of sandy and calcareous soils inland. It is probable that *Zygaena*



*purpuralis* Brunnich is also present, but was missed owing to its earlier season in flight, especially as this species was taken by W. M. Hutchison and the author at Carsaig Bay (a locality on limestone on the Isle of Mull, ten miles distant from Garbh Eileach) in mid-June 1953. This latter occurrence supports Beirne's statement that it also is typical of limestone hillsides.

#### FORMICIDAE :

*Myrmica rubra* L. vars. *macrogyna* and *microgyna* Brian (1949).

*Leptothorax acervorum* F.

*Acanthomyops (Lasius) flavus* F. In the opinion of the author, the abundance of this ant provides a further example of the influence of soil type, since it occurs mainly on alkaline soils.

*Formica lemani* Bondroit (this according to I. H. H. Yarrow is the *fusca*-like form of *Formica* in Scotland and N. England).

Apart from the above groups, the large horse-fly, *Tabanus sudeticus* Zeller, one inch in length and one of the bulkiest of British Diptera, was collected (almost too readily). The author is indebted to Mrs. Myra Russell Hunter for assistance in the preparation of this paper.

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## THE BIRDS OF THE GARVELLOCH ISLANDS

By MARGARET H. DUNN, W. RUSSELL HUNTER, B.Sc., Ph.D.,  
F.G.S. and ALASDAIR DUNN, D.A.

*(Received June, 1954)*

Earlier notes resulting from the 1949 expedition to the Garvelloch Islands (or Isles of the Sea) deal with the geology (Hunter and Muir, 1954), the molluscs (Hunter, 1953), and the insects (Muir, 1954) of the group. The present paper is intended to summarize the ornithological work of the expedition.

There is only one record of earlier observations on the birds of the Garvelloch (Harvie-Brown and Buckley, 1892), and the authors comment that the group does not support the large colonies of sea-birds typical of other islands of comparable size and remoteness. This absence of sea-birds was well known locally, but little other information could be gained about the birds of the group. On the 1949 expedition, most effort was directed towards obtaining some idea of the population numbers of both land and sea-birds on the islands.

In the case of those birds which occurred in small numbers, repeated direct counting of individual birds was the method of assessment employed (as in the case of the Chaffinch and the Great Tit, whose numbers were six and eleven pairs respectively). On the other hand, more numerous birds were assessed by the counting of individuals within several sample areas and multiplying these figures to correspond to the total area occupied by that species. (For example, the figure for the total population of wrens was obtained after making counts of nests over some sample areas of the cliffs which they occupied during the breeding season. Similarly, the total numbers of wheatears could be assessed when, at twilight on fine evenings, they were congregated on the outcropping rocks of certain ridges. Again, over sample stretches of ridge, counts were made of individual birds and the total amount of such ridges occupied by the Wheatear estimated). As a result, the figures given for the more abundant species must be regarded as being more ambiguous. The initial detection of suitable habitats of various species was made easy by the use of aerial photographs of the islands, which were provided for the expedition by the Air Ministry. For example, areas of scrub were first plotted from the photographs, then located on the ground.

Observations were made on three islands of the group, Garbh Eileach, Dun Chonnuill and A'Chuli, whose situation and scenery are outlined in Hunter and Muir (1954). The most

intensive work was done on the largest island and, in the following annotated list of the species which occur, the population numbers and breeding records refer to it (Garbh Eileach, 310 acres), unless otherwise stated.

- Hooded Crow, *Corvus cornix cornix* : six individuals feeding throughout the Garvelloch group, but breeding on Eileach an Naoimh.
- Twite, *Carduelis flavirostris pipilans* : about fifty birds breeding on Garbh Eileach, feeding on the sea-shore, cliff ledges, and limestone ridges.
- Chaffinch, *Fringilla coelebs gengleri* : six pairs breeding in the wood on Garbh Eileach.
- Reed-Bunting, *Emberiza schoeniclus schoeniclus* : two families, of six each, living in the shrubby willows of the central marsh on the main island.
- Sky-Lark, *Alauda arvensis arvensis* : occurring on the grasslands between the limestone ridges on all the islands (see Fig. 5 in Hunter and Muir, 1954), there being about fifteen pairs on Garbh Eileach.
- Meadow-Pipit, *Anthus pratensis* : breeding on the higher ground on all the islands, and individually the most numerous bird (possibly up to a thousand birds on the main island).
- Rock-Pipit, *Anthus spinoletta petrosus* : ten pairs breeding on a broad rock shelf below the western cliffs of Garbh Eileach.
- Great Tit, *Parus major newtoni* : about ten pairs breeding in the wood.
- Blue Tit, *Parus caeruleus obscurus* : at least four individuals, possibly breeding in the wood.
- Willow-Warbler, *Phylloscopus trochilus trochilus* : This is the most abundant warbler in the islands, an estimated total of seventy birds being distributed throughout the scrub "hedges" of the main island.
- Sedge-Warbler, *Acrocephalus schoenobaenus* : twelve birds probably breeding among the willows and alders of the marshy areas on Garbh Eileach.
- Whitethroat, *Sylvia communis communis* : at least two families living beside the Sedge-Warblers.
- Song-Thrush, *Turdus ericetorum ericetorum* : three pairs living on Garbh Eileach.
- Blackbird, *Turdus merula merula* : two pairs breeding on Garbh Eileach.

- Wheatear, *Oenanthe oenanthe oenanthe* : over a hundred birds on Garbh Eileach in June, the family groups observed in late July including about five young.
- Robin, *Erithacus rubecula melophilus* : about forty individuals living on the main island, their territories being smallest and most closely packed in and around the woodland and scrub.
- Wren, *Troglodytes troglodytes troglodytes* : On Garbh Eileach, families (averaging six individuals in each) were dispersed all over the island during the late summer, but in early June were mainly limited to cliff-faces in one gorge (Fig. 9 in Hunter and Muir, 1954), where about sixty pairs were seen.
- Cuckoo, *Cuculus canorus canorus* : A number were heard on Garbh Eileach in June and two young were seen later, both being fed by Meadow-Pipits.
- Kestrel, *Falco tinnunculus tinnunculus* : one seen on a single occasion flying over the limestone grassland on Garbh Eileach.
- Golden Eagle, *Aquila chrysaetus chrysaetus* : Three birds were seen in July-August : male, female and fully-fledged juvenile. The pair has bred, according to local knowledge, at an eyrie situated on the northern cliffs of Garbh Eileach, for many years. Food is almost exclusively rabbits, casts being found on every peak on the three northern islands : Dun Chonnuill, Garbh Eileach and A'Chuli.
- Common Buzzard, *Buteo buteo buteo* : Four pairs are resident, breeding on Eileach an Naoimh, but hunting also over Garbh Eileach and A'Chuli. Casts were found on these last two islands and some rabbits are taken by this species on the main island, but beetles, shore crabs, toads and small birds all make up part of their diet. After detailed analysis of casts, it is hoped to publish a further note on the food of these two species on the Garvelloch.
- Sparrow-Hawk, *Accipiter nisus nisus* : one pair living in the wood on the main island.
- Shag, *Phalacrocorax aristotelis aristotelis* : the only sea-bird breeding in any numbers. One colony of one hundred and fifty pairs occurs on the western cliff on A'Chuli (see Fig. 4 in Hunter and Muir, 1954), and a few individuals nest on Garbh Eileach. The A'Chuli birds spread all over the group of islands to fish, feed and roost.
- Woodcock, *Scolopax rusticola* : two pairs living on the main island.



Oyster-catcher, *Haematopus ostralegus occidentalis* : at least six pairs breeding on Garbh Eileach.

Gannet, *Sula bassana* ; Common Tern, *Sterna hirundo hirundo* ; Common Gull, *Larus canus canus* ; Kittiwake, *Rissa tridactyla tridactyla* ; and Razorbill, *Alca torda britannica* : These five species feed and roost around the Isles of the Sea, but are not known to breed.

Herring-Gull, *Larus argentatus argentatus* ; Lesser Black-backed Gull, *Larus fuscus graellsii* ; and Great Black-backed Gull, *Larus marinus* : These three species breed in small numbers on A'Chuli, but no nests were observed on Garbh Eileach.

It is perhaps valuable to compare the numbers of species in the above list with records of the birds breeding on similar small islands. Lack (1942) has brilliantly summarized the known facts with particular reference to the Orkneys and Shetlands. The size and remoteness of any island apparently determines the number of species to be found on it. The smaller, more remote island may gain a few species of sea-birds not occurring on the larger land-masses, but it will have many fewer resident land species. Under consideration in this way, the Garvelloch lie over six miles from the mainland (only two miles from other small islands), and are small, the whole group barely totalling one square mile in area. According to Lack's hypothesis, therefore, they are roughly comparable to such islands as the Treshnish, and might be expected to support large numbers of many species of breeding sea-birds, with only a relatively poor fauna of land-birds.

From the above list, some facts are immediately obvious ; out of thirty-three species, only nine are sea-birds. The poverty of marine species is emphasized if breeding is considered : out of twenty-three (perhaps twenty-eight) species breeding on the islands, only four are sea-birds. These figures are very different from those of Lack (1942), and of Darling (1947), who found, on Priest Island, in the Summer Isles, twenty-nine species breeding, of which thirteen were sea-birds. In numbers of individual birds, this absence of breeding marine species is again apparent ; apart from the Shag colony on A'Chuli, there are no colonies of sea-birds on the Garvelloch group. It may be that this absence of sea-birds is not unconnected with the presence of so many breeding land-birds, that is, that some exclusion occurs.

Detailed comparisons with the lists of breeding land-birds of other Hebridean islands are valuable. Some species are unusual on islands less remote and larger than the Garvelloch



(for example, on islands six times the area of Garbh Eileach). Such species are the Reed-Bunting, the Great-Tit, the Blue-Tit, the Sedge-Warbler, the Whitethroat, the Golden Eagle, and the Woodcock. Other land species, widespread throughout the Hebrides but absent from other small islands (similar in size to A'Chuli, 100 acres), occur in the Garvelloch group, *e.g.* the Willow-Warbler, the Blackbird and the Sparrow-Hawk.

In summary, certain unexpected species of land birds occur, paralleling a surprising absence of sea-birds. The bird fauna of the Isles of the Sea is modified from that which could be expected on islands of such size and degree of remoteness, by certain features of the ecology of the group (see Hunter, 1954). The limestone soils of the Garvelloch (Hunter and Muir, 1954), through their effects on the vegetation, provide the particular habitats (woods, scrub, etc.) which are required by certain birds ; and, through their effects on the vegetation, the insects, and the snails of the islands (Hunter, 1953), control the food supply of most land-birds.

Acknowledgements are made elsewhere of the help received by the expedition from persons and institutions ; but the authors wish to acknowledge their indebtedness to their seven companions, and to Myra Russell Hunter for assistance in the preparation of this paper.

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## ON ANIMAL ECOLOGY IN THE GARVELLOCH ISLANDS

By W. RUSSELL HUNTER, B.Sc., Ph.D., F.G.S.

(Received June, 1954)

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All communities of organisms living on small islands differ to some extent from the fauna and flora of the nearest larger land masses. In differing degrees, the ecology of all islands is affected by certain familiar factors: by their isolation, by their strictly delimited space, and by the modified climatic conditions brought about by the proximity of the sea. Previous work in the Hebrides has emphasized the effects of island-size and degree of isolation on the fauna (*e.g.* see Darling, 1947, and references therein.) As noted elsewhere (Hunter, 1953; Hunter and Muir, 1954), a common feature of the environment provided by the Hebrides is a lack of limestone resulting in rather acid soil conditions producing peat formation and consequently low fertility. (Shell-sand has of course modified this "lime-hunger" in the strips of *machair* which are the most fertile lands in the Hebrides.) Fifteen per cent. of the rocks which outcrop in the Garvelloch are limestone and, of the remainder, at least forty-five per cent. are calcareous. Even in some parts where the rocks beneath are non-calcareous, alkaline soils occur as a result of *hard* waters draining from the limestone (Hunter and Muir, 1954). It is impossible for the author to give a detailed account of the flora which results on these calcareous soils, but the lushness of the vegetation on any of the group is striking. Certain plant communities are mentioned in the course of an earlier account of the land snails (Hunter, 1953), and one feature of the Garvelloch vegetation is worth noting here. In all the little glens of the islands there is a rich growth of scrub forming long belts, densely packed and intergrown like man-made hedges, about eight feet high. The dominant bushes are willows, and Mr. B. W. Ribbons has identified a specimen as a hybrid, *Salix atrocinerea* x *aurita*. Other species occur, including Alder, Hazel, Birch, Rowan and Hawthorn. On other Hebridean islands of comparable size brushwood is on a much smaller scale, and perhaps the most usual plant is bog myrtle, *Myrica gale*. Few of the small exposed Hebrides (*i.e.* islands of a few hundred acres in area) have any semi-natural woodland. However, Garbh Eileach has a well-developed wood at its northern end, in which Oak and Ash are present as well as the species mentioned above.

The major concern of the 1949 expedition to the Isles of the Sea was to assess the effects of the limestone—through the vegetation and in other ways—on the fauna. The animals most thoroughly surveyed were the land snails, of which an account has already been published (Hunter, 1953). Five species of snails had not previously been found in the South Ebrudes (v-c. 102), while six further species are calcicole and are absent from most of the smaller Hebrides. Not only do more species of snails occur on the Garvelloch than occur on more typical small peat-soil islands in the Hebrides, but counts of their densities show that the numbers of individual snails are higher. Although no full survey could be made, the insects which occur on the Garvelloch include lime-loving forms (Muir, 1954), and the presence of limestone also brings about a change in the intertidal fauna of the rocky shores (Hunter, 1953).

Even the vertebrate fauna of the islands is partly determined by the calcareous nature of the rocks. The birds are discussed in a separate account (Dunn, Hunter and Dunn, 1954), and the limestones have undoubtedly affected the bird fauna, both through resultant vegetation providing a suitable habitat for some species (*e.g.* the wood), and through the abundance of certain organisms providing food for others (*e.g.* snails). Among the land-birds of the Garvelloch, seven species occur whose presence would be unusual on other Hebrides less remote and six times bigger, while at least a further three species are rare on islands of comparable size and remoteness. With perhaps two exceptions, the land vertebrates other than birds have been introduced by man. Sheep and bullocks are grazed on the islands, but they are periodically removed and replaced by other stock. On the other hand, the goats and rabbits introduced to Garbh Eileach can be considered part of the permanent fauna, and no longer domestic animals. The goats are completely feral, finding food along the ledges of the western sea-cliffs, breeding, and maintaining a small but stable population in the more inaccessible parts of the main island. Rabbits, of earlier introduction, are not found elsewhere in the group, but on Garbh Eileach are so numerous as to upset the whole economy of the island (*e.g.* bracken, *Pteridium aquilinum*, being distasteful to rabbits, is abundant there, although no other extensive patches occur throughout the group). But, perhaps the most surprising effect of the calcareous soils and their vegetation is that stags of the Red Deer (*Cervus elephas*) are occasionally found grazing on Garbh Eileach (*e.g.* four were known to be present in early summer, 1953). The nearest deer forest is the



island of Scarba and these males which fatten up on the rich pasture have completed an extensive voyage. To some extent, other smaller islands form a series of stepping-stones and it is probable that the stags make their journey by way of Lunga and the Black Isles, crossing several sounds, the widest of which involves a swim of well over a mile and a half. The distance to be swum on the whole journey totals nearly three miles, through waters with strong and variable tidal currents. The western breezes may carry to Scarba some fragrance of the lush vegetation, to drive these stags to this effort.

Although the Garvelloch are at present uninhabited, there are extensive ruins of buildings on the islands. The monastic remains on Eileach an Naomh are well known as one of the best preserved and most extensive settlements of the Columban monks (Bryce and Knight, 1928), and on Dun Chonnuill, fortifications enclosing the remains of at least twelve buildings were traced during the 1949 expedition. Over all the islands, aerial photographs reveal rigs and furrows of old cultivation and the foundations of large number of beehive cells. A small community on the islands could, through the very fertile soils, have been readily self-supporting. The size, inaccessibility and fertility of the islands all combined to make them suitable for a monkish settlement of the early Celtic Church. A succession of crofting farmers lived on the Garvelloch up to the beginning of this century, but at present the islands are used only for fattening bullocks and sheep. The difficulties of taking half-feral cattle and sheep off these rocky islands are outweighed, economically, by the high standard of the store beasts after a year or so of grazing on the rich pastures of the islands.

The foregoing notes can be summarized. From the limestone rocks are derived calcareous soils which stretch over much of the Garvelloch. These soils support a lush vegetation, and also directly affect the abundance of certain lime-loving animals, notably snails. The vegetation in turn provides food for the insect fauna, for abundant snails, for other herbivores like rabbits and deer, and also for the seed and fruit-eating birds. In addition it provides a suitable habitat, apart from feeding, for many birds and other animals. The abundance of snails and insects has contributed to the prevalence of such land-birds as feed on them. Finally, the fertility of the calcareous soils has attracted man to the islands. More than any other single environmental factor, the occurrence of limestone has defined the fauna of the Garvelloch.



The expedition received a grant from the University of Glasgow, which is gratefully acknowledged ; while four-fifths of the expenses were borne by those who took part. I must acknowledge my indebtedness to others : especially to my companions on the 1949 expedition, to Professor C. M. Yonge, C.B.E., F.R.S., for his continued encouragement, to the proprietors of the Garvelloch Islands and to the tenant, Ian S. MacKenzie, Esq., of Dunsmeorach, and finally to Miss Mabel G. Scott and my wife for their assistance in preparing these papers.

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**LIST OF FIRST ARRIVALS OF SUMMER BIRDS IN  
CLYDE AREA IN 1953. COMPILED FROM REPORTS OF  
MEMBERS AND FRIENDS**

BY THOMAS ROBERTSON

| <i>Bird</i>                  | <i>Date</i> | <i>Locality</i>        | <i>Average<br/>Date<br/>over 59<br/>years</i> | <i>Earliest<br/>Date, 1952</i> |
|------------------------------|-------------|------------------------|---|--------------------------------|
| Lesser Black-<br>Backed Gull | Feb. 8      | Richmond Park, Glasgow | Mar. 8  | Jan. 13                        |
|                              | Feb. 21     | Loch Lomond            |   |                                |
|                              | Mar. 4      | Stevenston             |   |                                |
| Pheasant                     | Mar. 14     | Fannyside              | Mar. 24                                       | Mar. 12                        |
|                              | Mar. 21     | Dalry                  |   |                                |
|                              | Mar. 23     | Southend, Kintyre      |   |                                |
| Willow<br>Warbler            | Mar. 25     | Carnwath               | April 12                                      | Mar. 15                        |
|                              | April 12    | Buchanan Castle        |   |                                |
|                              | April 13    | Langbank               |   |                                |
| Garden<br>Warbler            | Mar. 30     | Bishopton              | May 8   | May 5                          |
|                              | May 5       | Pollok Park, Glasgow   |   |                                |
|                              | May 10      | Drymen                 |   |                                |
| White Wagtail                | April 1     | Richmond Park          | April 4                                       | April 10                       |
|                              | April 16    | Stevenston             |   |                                |
| Sand Martin                  | April 8     | Dalry                  | April 8                                       | Mar. 29                        |
|                              | April 11    | Loch Bowie, Dumbarton  |   |                                |
|                              | April 11    | Bardowie Loch          |   |                                |
| Common<br>Sandpiper          | April 12    | Endrick at Drymen      | April 13                                      | April 13                       |
|                              | April 12    | Balgray Reservoir      |   |                                |
|                              | April 18    | North Bute             |   |                                |
|                              | April 18    | Skelmorlie             |   |                                |
| Swallow                      | April 12    | Balmaha                | April 10                                      | April 10                       |
|                              | April 15    | Southend, Kintyre      |   |                                |
|                              | April 16    | Dalry                  |   |                                |
| Tree Pipit                   | April 18    | North Bute             | April 23                                      | April 18                       |
|                              | April 19    | Gartocharn             |   |                                |
|                              | April 26    | Milngavie Moor         |   |                                |
| Chiffchaff                   | April 19    | Lochwinnoch            | April 8                                       | Mar. 15                        |
|                              | April 22    | Rouken Glen, Glasgow   |   |                                |
|                              | April 26    | Milngavie Moor         |   |                                |
| House Martin                 | April 19    | Gartmore               | April 25                                      | April 13                       |
|                              | April 26    | Newton Mearns          |   |                                |

| <i>Bird</i>                              | <i>Date</i>                         | <i>Locality</i>   | <i>Average<br/>Date<br/>over 59<br/>years</i> | <i>Earliest<br/>Date, 1952</i> |
|--|-------------------------------------|---|---|--------------------------------|
| <b>Redstart</b>                          | April 21<br>April 25<br>April 25    | Balmaha<br>Richmond Park<br>Inch Tavannich, Loch Lomond     | April 26                                      | April 18                       |
| <b>Cuckoo</b>                            | April 22<br>April 24<br>May 1       | Stevenston<br>Kilwinning<br>Luggiebank                      | April 22                                      | April 21                       |
| <b>Common<br/>Whitethroat</b>            | April 23<br>April 28<br>May 1       | Drymen<br>Richmond Park<br>Cumbernauld                      | May 1   | April 30                       |
| <b>Wood Warbler</b>                      | April 25                            | Luss  | May 2   | April 27                       |
| <b>Yellow<br/>Wagtail</b>                | April 26<br>May 1<br>May 2          | Hamilton<br>Oatlands, Glasgow<br>Lochwinnoch                | April 21                                      | April 19                       |
| <b>Corncrake</b>                         | April 27<br>April 30<br>May 1       | Dalry<br>Southend<br>Hamilton                               | April 25                                      | April 25                       |
| <b>Whinchat</b>                          | April 29<br>May 3<br>May 5          | Possil<br>Craigallion<br>Southend                           | April 28                                      | April 18                       |
| <b>Terns<br/>(Common<br/>and Arctic)</b> | April 29<br>April 30                | Southend<br>Dalry   | May 6   | April 12                       |
| <b>Sedge<br/>Warbler</b>                 | April 29<br>May 2<br>May 3<br>May 3 | Possil Loch<br>Lochwinnoch<br>Gartcosh<br>Darvel            | May 2   | April 27                       |
| <b>Swift</b>                             | May 3<br>May 7<br>May 7             | Loch Bowie, Dumbarton<br>Partick, Glasgow<br>Bridge of Weir | May 2   | April 28                       |
| <b>Grasshopper<br/>Warbler</b>           | May 6<br>May 10<br>May 13           | Southend<br>Drymen<br>Possil Loch                           | May 5   | April 25                       |
| <b>Spotted<br/>Flycatcher</b>            | May 6<br>May 9<br>May 16            | Fannyside<br>Drymen<br>Richmond Park                        | May 10  | May 2                          |
| <b>Sandwich<br/>Tern</b>                 | April 6<br>April 20                 | Ballantrae<br>Stevenston                                    | } Rarity seldom reported.                     |                                |

## EXCURSION REPORTS

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*Full Reports may be consulted at the Library.*

EDINBURGH, ZOOLOGICAL PARK AND ROYAL BOTANIC GARDENS,  
6th April—*Leader*, Mr. B. W. RIBBONS.

Dr. Davis of the Botany Dept., University of Edinburgh, and Mr. Keenan escorted a party of thirty through the gardens.

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ROSSDHU, LOCH LOMOND, GLASGOW UNIVERSITY FIELD STATION—  
2nd May—*Leaders*, Dr. HARRY D. SLACK and Dr. W. RUSSELL HUNTER.

In one of the laboratory huts was exhibited apparatus used in research on the biology of the loch; the methods of using these were explained to the twenty-four members present. Small parties then had an opportunity of visiting the research motor launch where Dr. Slack gave talks on the seasonal variations in the loch and demonstrated further apparatus. The gear on the launch included newly-fitted *thermistor* equipment for plotting the water temperature stratification in the depths of the loch.

---

DUNURE AND CULZEAN CASTLE, 25th May—*Leader*, Mr. RICHARD PRASHER.

Thirty members were present. At Dunure, plants noted included *Helianthemum Chamæcistus*, *Trifolium arvense* and *Scilla verna*. At Culzean Castle among the rare shrubs were two specimens of *Ginkgo biloba*. *Cheiranthus cheiri*, *Rosa spinosissima* and *Smyrniium Olusatrum* were abundant.

---

MILLPORT AND MARINE BIOLOGICAL STATION, 6th June—*Leader*, Mr. JOHN BOYD.

Seven members were present on this excursion. Dr. Barnes demonstrated the marine television apparatus which belongs to the Calanus.

Among the plants observed, *Apium inundatum* was most noteworthy.

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LEADHILLS (Joint with Edin. Nat. Hist. Soc.), 13th June—*Leader*, Dr. D. PATTON.

Twenty-seven of our members were present and were joined at Leadhills by the Edinburgh party led by Dr. Charles D. Waterstone of the Royal Scottish Museum. The geology and botany of the Wanlockhead-Leadhills area were investigated. Thereafter the combined party visited Craiggyffe Quarry, Carmichael, to see the Felsite exposure.

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ARROCHAR, 4th July—*Leaders*, Mr. D. LOTHIAN, Professor K. W. BRAID.

This excursion was attended by twelve members. The chimney-sweeper moth, *Odezia atrata*, was abundant; this moth in its larval stages feeds on earth-nut, and is very local in Scotland. Near the top of Loch Long a fine bed of *Scirpus maritimus*, Sea club rush, attracted much attention. There was also noted a large group of white-flowered bittersweet, *Solanum dulcamara*, which is of very local occurrence. The flowers were smaller than usual, slightly distorted, with faintest tinge of blue; fruits were typically red.

---

BALLOCHRAGGAN, 1st August—*Leader*, Professor K. W. BRAID.

Six members attended. A description of the types of experiments carried out at the Bracken Experimental Station during the past ten years was given; some of the sites were visited and the results discussed.



Interesting plants observed were :—*Sedum villosum*, *Utricularia minor*, *Hymenophyllum unilaterale*, *Lycopodium Selago*, *Selaginella selaginoides*. A barren specimen of *Pyrola secunda* was seen at approximately 900 ft. This is a new record for the area.

---

BURNBETH, BRIDGE OF WEIR, 5th September—*Leader* Mr. JAMES KIRKWOOD.

This excursion was a conjoint one with the Paisley Naturalists' Society. Plants especially noted were :—*Senecio saracenicus* (in bloom) and *Arenaria serpyllifolia*.

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TINTO, 28th September—*Leader* Mr. R. MACKECHNIE.

Eighteen members took part.

The most noteworthy plants seen on the ascent were :—*Ranunculus Lenormandi*, *Rubus Chamemoris*, *Vaccinium Vitis-idaea*, *Carex rigida*. A pair of stoats, two roe deer, both species of hare and a few grouse were reported.

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## SECTION REPORTS

### Botanical Section (*Convener*, Mr. PRASHER).

Fourteen excursions were made as arranged. There was an average attendance of eight members. A new locality for *Claytonia perfoliata* was found at Dumbarton. Other interesting observations were :—

BLACKWOOD : *Chelidonium majus*, *Leontodon hispidus*, *Briza media*.

IRVINE : *Nasturtium sylvestre*, *N. palustre*, *Viburnum Opulus*, *Pyrola minor*, *Epipactis latifolia*.

PORTINCROSS : *Geranium sanguinum*, *Oenanthe Lachenalii*, *Allium vineale*.

DARNLEY : A plant of Cock's-foot-Grass was found in viviparous condition.

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### Ornithological Section (*Convener*, Miss MAXWELL).

Six Saturday excursions, three evening excursions and three joint excursions with the Botanical Section were carried out. There was an average attendance of four members. The most interesting bird seen and heard was the grasshopper warbler, at Possil Marsh, on 13th May.

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### Zoological Section (*Convener*, Mr. CROMBIE).

Some preliminary work has been done towards the Survey of the Arden Basin. Some new records of Mollusca made during the year will be published later.

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### Entomological Section (*Convener*, Mr. DAVID M. LOTHIAN).

Excursions were held as arranged to the Arden Basin and Calderwood Glen.

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### Geological Section.

Three excursions were made to the Arden Basin and others to Gourock and Glenarbut. At Darnley a new quarry has been opened ; eighteen feet of shale have been removed from above the Orchard Limestone Bed. The shale is highly fossiliferous and a vein of barytes has been found. The winter meetings have formed an important feature of the activities of the Section.

## SESSION XXIII—1953

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## DIGEST OF THE PROCEEDINGS OF THE SOCIETY

13TH JANUARY 1953.

Dr. Patton presided.

Ten new members were admitted :—Miss Catherine Currie, 88 Norse Road, W.4 ; Miss A. D. MacDonald, 93 Oakfield Avenue, W.2 ; Miss Anne McLean, 101 Gala Street, E.1 ; Miss Catherine S. Nicol, 27 Kingshouse Avenue, S.4 ; Miss Patricia J. M. Price, M.A., 57 Ravenswood Drive, S.1 ; Miss Elizabeth M. Young, 67 Hillview Street, E.2 ; Mr. James D. Hamilton, 97 Kingsheath Avenue, Rutherglen ; Mr. H. M. Mortimer, 56 Croftburn Drive, S.4 ; Mr. Robin Russell, 102 Park Road, C.4 ; Mr. A. A. Thrippleton, A.R.P.S., A.M.I.E.I., 14 Portland Park, Hamilton.

Mr. C. E. Palmar, A.R.P.S., presented the Exhibition of the Photographic Section.

10TH FEBRUARY.

Dr. Patton presided over the Annual Business Meeting.

The reports of the Society's activities were read and approved. The librarian intimated that he had received a gift of books on Natural History from Mr. Stollery. New office-bearers were elected (p. 155).

New Section Conveners elected were :—Ornithological, Miss Mary M. Maxwell ; Zoological, Mr. Iain Crombie, B.Sc.

10TH MARCH.

Dr. Patton presided.

Mr. Palmar announced a gift, from Mr. Rennie, of three albums of photographs relating to the Society.

Dr. Stuart M. K. Henderson, of the Glasgow Museum, gave an address on "The Pre-Cambrian Rocks of the Southern Highlands."

13TH APRIL.

Dr. Patton presided.

Four new members were admitted :—Miss Elizabeth Cawthra, 23 Clouston Street, N.W. ; Miss Anne Thomas, 7 Hamilton Road, Tollcross ; Mr. J. Bell, Bothy, Botanic Gardens ; Mr. Robert Steele, 9 Lindsay Place, W.2.

Professor K. W. Braid read a note on "The Great Spotted Woodpecker."

Dr. Alex. R. Hill delivered a lecture on "Aphids." He said that this group of insects is studied mostly by the specialist and avoided by the amateur naturalist. This is in some measure due to the present day lack of suitable and accurate keys for their identification. The naming of aphids or greenflies is greatly complicated by the fact that most species exist in a number of morphologically different forms and have complex life cycles including primary and secondary host plants as well as cyclic parthenogenesis. Research is in progress in the Zoology Department at Glasgow University on the phenomenon of resistance of crop plant varieties to the attacks of aphids. While some varieties are highly susceptible to aphids and become quickly smothered and weakened by them, certain other varieties show partial to almost complete resistance and bear little or no infection.

## 11TH MAY.

Dr. Patton presided.

Mr. Joseph McInnes, 9 Shearer Street, C.5 was admitted to the Society.

Mr. A. A. Thrippleton delivered a lecture on "Artic-Alpine Plants in Scotland," illustrated by colour transparencies.

## 8TH JUNE.

Dr. Patton presided.

Two new members were admitted to the Society: Miss Tillie Boobis, 495 St. Vincent Street, C.3; Miss Sheila M. Munro, 469 Kilmarnock Road, S.3.

Mr. Robert Mackechnie, B.Sc., was congratulated on becoming an Associate of the Linnaean Society, *honoris causa*.

Mr. Thomas Robertson submitted a list of the first arrivals of Summer Birds in the Clyde Area (p. 151.)

The Annual Exhibition, with contributions from all the Sections, was held. Dr. Lloyd arranged a special exhibit illustrating Professor Henney's Herbarium and also showed books from the old Andersonian University.

## 13TH OCTOBER.

Mr. W. J. Cannon, F.G.S., Vice-president, was in the Chair.

Four new members were admitted:—Mr. and Mrs. William Lennox, 108 Buccleuch Street, C.3; Mr. Donald MacKinnon, B.Sc., 70 Waldemar Road, W.3; Mr. Rupert Roddam, 40 Linthaugh Road, S.W.3.

Dr. Patton delivered his Presidential Address on "The British Herbarium of the Botanical Department of Glasgow University" (p. 105).

## 10TH NOVEMBER.

Dr. Patton presided.

Mr. P. C. Sylvester-Bradley of the University of Sheffield is collecting data for a Rose Survey of the British Isles. It was reported that the part of the work undertaken by Professor Braid, Mr. Lee and others for this year had been completed.

Professor Walton delivered a lecture entitled "A Botanist at Sea." He gave an account of a voyage to Vancouver and made special mention of *Sargassum*, of which he showed specimens. The lecture was illustrated by lantern slides.

## 8TH DECEMBER.

Dr. Patton presided.

Miss Isabelle C. Gardner, B.Sc., 120 Broomhill Drive, W.1, was admitted to membership.

Miss McColm gave an interesting account of a holiday in Australia and New Zealand.

Mr. Lothian and Mr. Graham gave a joint talk on "The Technique of Entomology."

Professor Braid read a paper on Dr. James Cargill, an early Aberdeen Botanist (p. 127).



## Obituary

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### Rev. ROBERT BARR

The Rev. Robert Barr, M.A., T.D., J.P., was born on 1st May, 1863, and died at Neilston on 1st March, 1952. He came of farming stock and was born and bred in the Bearsden area. After graduating at Glasgow University he was for a time assistant at the Martyrs Church, Paisley. From there he went to Neilston Old Parish Church as minister in charge, an office which he held for 57 years until his death.

In 1910 he joined the *Andersonian Naturalists' Society* and his election in 1918 as a member of the *British Mycological Society* showed in which direction his interests lay. He did not hold office in the Andersonians but kept up his interest in their activities until recent years. For some years he acted as joint leader of the Autumn Fungus Forays.

Mr. Barr had a questing mind in all Nature's affairs ; in birds and beasts ; in flowers and in human kind. He was a man of wide and deep sympathies, broad minded, not judging too harshly the failings of his fellows. It is reputed that no applicant was turned away from his door empty handed ; each would doubtless be given a word in season for he was a shrewd judge of character and though forgiving and tolerant, was no foolish sentimentalist.

It will be for his enthusiasm on the Fungus Forays that he will best be remembered by Andersonians. Nothing gave him greater pleasure than roaming the woods in search of the despised toadstools and he was quick to respond to any one who showed the slightest interest in them. He delighted in demonstrating their variety, their exquisite structure and delicate colouring. It was a great loss to the Forays when advancing years and infirmities compelled him to absent himself.—R. H. JOHNSTONE.





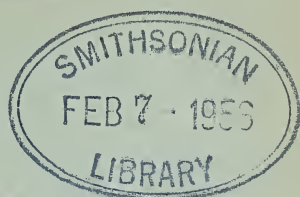
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FEB. 1, 1956

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# CONTENTS

| PAPERS—  | PAGE |
|--|------|
| The Plants of Possil Marsh   |      |
| Donald Patton and William Rennie ... ..  | 160  |
| Endemicism in the Snails of Jamaica  |      |
| W. Russell Hunter ... ..   | 173  |
| Ben Lawers—past and present  |      |
| John R. Lee and Donald Patton ... ..   | 184  |
| Observations on Exotic Fishes  |      |
| Wm. John Cannon ... ..   | 189  |
| Climatological and Salinity Data for Millport, Scotland  |      |
| H. Barnes ... ..   | 193  |
| Some Observations on Beetles of the family Clambidae   |      |
| R. A. Crowson and E. A. Crowson ... ..   | 205  |
| New and newly-confirmed distribution records of non-marine<br>Molluscs in the West of Scotland (IIIrd paper) |      |
| W. Russell Hunter ... ..   | 207  |
| List of First Arrivals of Summer Birds in Clyde Area in 1954   |      |
| Compiled by Thomas Robertson ... ..  | 212  |
| CORRECTION AND ACKNOWLEDGEMENT ... ..  | 159  |
| LIST OF OFFICE-BEARERS ... ..  | 214  |
| NOTES FROM EXCURSION AND SECTIONAL REPORTS   | 215  |
| DIGEST OF THE PROCEEDINGS OF THE SOCIETY ...   | 216  |

# The Glasgow Naturalist

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GLASGOW AND ANDERSONIAN NATURAL HISTORY  
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## A CORRECTION

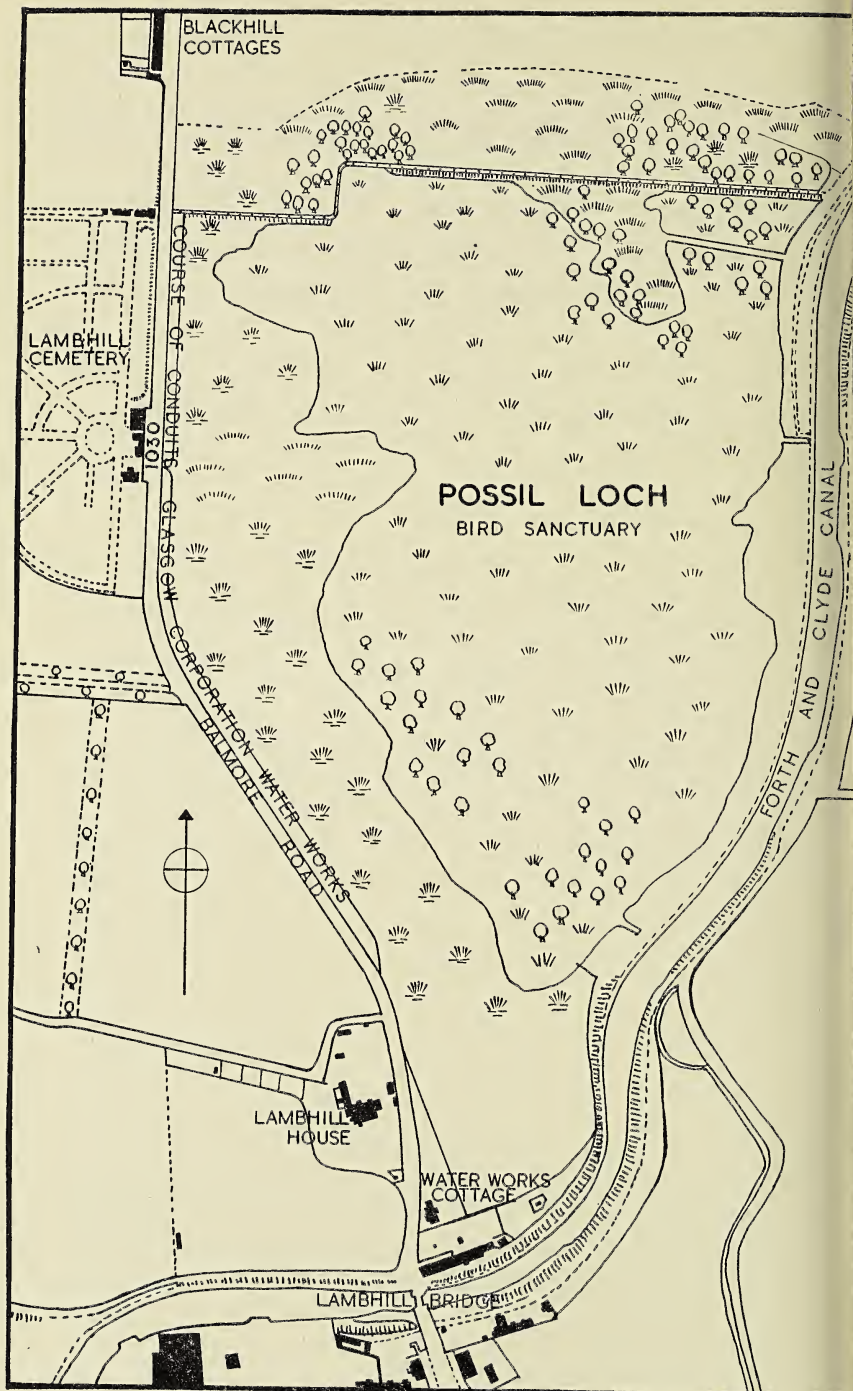
(In part 2 of Volume XVII of the *Glasgow Naturalist* on  
page 79, line 3)

The plant recorded in the list of "Additions to the Flora of the Clyde Area" as *Mentha rotundifolia* L. should be expunged from the list. Miss M. H. Cunningham of Campbeltown reports that the specimen so named has been submitted to Mr. R. A. Graham of Northwood, who corrects the identification to a form of *M. alopecuroides* Hull.

—JOHN R. LEE (26th February, 1955).

## AN ACKNOWLEDGEMENT

The Council of the Society is greatly indebted to the Royal Society for a substantial grant covering the cost of publication of the papers forming pages 129 to 150 of the last issue (Volume XVII, Part 3) of the *Glasgow Naturalist*.



## THE PLANTS OF POSSIL MARSH

By DONALD PATTON\* and WILLIAM RENNIE\*

*(Received April, 1955)*

Sir William Hooker, who occupied the Chair of Botany at Glasgow University from 1820 - 1841, used to say that every Glasgow botanist was baptised in Possil Marsh ; and since his day most Glasgow naturalists have been initiated there. Thus, in Hooker's time, Possil Marsh existed as a locality worthy of the attention of botanists.

Two very interesting publications throw much light on the early history of Possil Marsh ; one in "Trans. and Proc. of the Glasgow Natural History Society," vol. 1. (N.S.) p. 196, by Robert Turner on "Thomas Hopkirk of Dalbeth—a Sketch of his Life and Botanical Work" which was read to the Society on 27th January, 1885 ; the other "Possil Marsh—Yesterday and Today," by William Rennie, 1951. The latter gives a very comprehensive survey of the Marsh, dealing both with its history and with its natural history.

Possil Marsh lies within three miles of the Glasgow Royal Exchange to the N.W. of the City.

The land surrounding what is now Possil Marsh was at one time the extreme western boundary of what was Bishop's Wood or Moss, and the view accepted to-day is that Possil Marsh was cut off from the western end of this stretch of bogland by the formation of the Forth and Clyde Canal. Operations commenced in the east at Grangemouth in 1768. Pennant, in his "Tour of Scotland," passing between Kilsyth and Bannockburn on 11th September, 1769, mentions that the work of the canal was in progress. By 1775 the canal was navigable as far as Stockenfield, a short distance *west* of the Marsh. It was not until 15 years later that the canal was open to Bowling.

There is thus no doubt that several species were introduced into the Marsh from the east. (Note that there are about 15 miles open canal east of Possil Marsh, whilst about a mile to the west the locks again begin.) Several circumstances would contribute to this ; *e.g.*, the dumping of material—barge borne—on the eastern margin of Possil Marsh alongside the tow-path, and the transference of plants to the area by water or by natural distribution from the canal, once the course had been opened up.

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\* Rennie's associations with the Marsh extend beyond the three score years and ten, Patton's over fifty years.



There is no mention of Possil Marsh in Lightfoot's "*Flora Scotica*," 1777. The first botanical reference to Possil Marsh appears to be the "lake" mentioned by Smith, 1800, in his "*Flora Britannica*." The formation and extension of this "lake" has no doubt been due to the caving in of the old mine workings of the district. This would also account for Hopkirk's (1813) reference to "the deep hole in the Marsh, Possil." Turner, too, recognises Smith's "Lake" as Possil Marsh or Loch.

The change most apparent to the eye to-day is the great increase in the water surface; much of the area now under water can be remembered as green fields and scrub. Two additional factors also account for the extension of the Marsh.

- (1) The cutting down (1894 and 1912) of the trees which skirted the Balmore Road. These were beeches and amongst them grew *Pyrola minor*.
- (2) The raising of the level of the canal by 4 inches, by increasing the height of the overflows.

At present the area of Possil Marsh may be estimated at 70 acres.

There is one factor in dealing with the Flora of Possil Marsh which must not be overlooked. Various botanists and others have, during the past 50 or 60 years, attempted to introduce certain species which they thought would either be at home in the marsh—or should be there. Some of these plants have become well established, others have disappeared. The latter, since they do not appear in the list which follows, included:—

*Ranunculus ficaria* Linn.

Introduced at Pipe Track next road—two attempts at least. (Rennie.)

*Nymphaea alba* Linn.

Rennie 1910 - 1912.

*Ceratophyllum demersum* Linn.

Rennie 1942 and 1944 from Firhill Timber Basin.

*Drosera rotundifolia* Linn.

Rennie—see list.

*Campanula rotundifolia* Linn.

Seeds were scattered by some one, between overflow and ditch. Plants held on for a few years.

*Lythrum salicaria* Linn.

Rennie—many years ago—on E. side.

*Lycopus europaeus* Linn.

Rennie—many years ago—on E. side.

*Utricularia vulgaris* Linn.

Rennie, many years ago.

*Lemna gibba* Linn.

Rennie, from York.

*Lemna polyrrhiza* Linn.

Rennie, from Firhill Timber Basin.

*Typha angustifolium* Linn.

Rennie.

*Ceterach officinarum* DC.

Rennie—On dyke N.E. of Possil Marsh.

Lasted four years.

*Asplenium adiantum-nigrum* Linn.

Rennie—on dyke N.E. of Possil Marsh.

Turner, writing in 1885, deplores the fact that the changes within the Marsh in his time prevented any stability in the vegetation ; and still the changes go on. Thus one feature of a survey of the plant life of Possil Marsh is the number of species which have been recorded for the area and no longer grow there, not because of the unscrupulous collector but because of these changing ecological conditions. These plants will be referred to in the following list of plants.

Unless otherwise stated the plants recorded here have been observed in Possil Marsh area since 1954. An \* indicates that a specimen is contained in the Herbarium of the Botany Department of Glasgow University. B.A.F. refers to the "Flora and Fauna of the West of Scotland," B.A. Handbook, 1876. Other recorders are also mentioned.

\* *Ranunculus lenormandi* F. Schultz.

Hennedy, B.A.F.

\* *R. hederaceus* Linn.

Hennedy, B.A.F. Has not been found in recent years.

*R. sceleratus* Linn.

Hennedy says "Banks of Forth and Clyde Canal." Introduced from the canal. This plant first made its appearance at the south corner of the marsh near Lambhill Road, after a portion of the ground behind the cottages had been levelled up with material brought from outside by barge (c. late 1880's).

\* *R. lingua* Linn.

Not mentioned by Hopkirk (1813).

Patrick (1831) "Great Canal—Stockenfield."

Hennedy "Plentiful" in Marsh.

Introduced from Canal to Possil Marsh.

*R. acris* Linn.

*R. repens* Linn.

*R. bulbosus* Linn.

Introduced by Rennie at various times up till 1918.

\* *Caltha palustris* Linn.

\* *C. palustris* var. *radicans* Forster.

\* *Nasturtium officinale* R. Br.

*Rorippa amphibia* (L) Besser.

Hopkirk, 1813.

Hooker, "Flora Scotica"—"In the Marsh beyond Possil."

Patrick (1831) does not record it.

No longer in Marsh.

*Barbarea verna* (Mill.) Aschers.

Exhibited from Marsh by George Horn. See Minutes of  
Glas. East Bot. Soc., 7.6.1876.

Not now in Marsh.

\* *Cardamine pratensis* Linn.

Hennedy "In Possil Marsh double flowers are frequently  
obtained."

\* *C. hirsuta* Linn.

*C. flexuosa* With.

*Erophila verna* (L) Chevall.

Hennedy, "Banks of Forth and Clyde Canal at Possil  
Marsh."

*Armoracia rusticana* Gaertn.

Hopkirk. "In the marsh beyond Possil."

Hennedy, "I have never been able to find this plant in  
this station." Not now in Possil Marsh.

*Arabidopsis thaliana* (L) Heynh.

*Sinapis arvensis* Linn.

*Capsella bursa-pastoris* (L) Medik.

*Lepidium smithii* Hook.

B.A.F.

*Viola palustris* Linn.

Hennedy.

*Polygala vulgaris* Linn.

Hennedy.

*Lychnis flos-cuculi* Linn.

Hennedy.

*Melandrium rubrum* (Weig.)=*Lychnis dioica* Mill.

Disappeared in the late 1930's.

\* *Agrostemma githago* Linn.=*Lychnis Githago* Scop.  
1839. But not now.

*Cerastium vulgatum* Linn.

- Stellaria holostea* Linn.
- \* *S. glauca* With. (included in *S. palustris* Retz).  
Hopkirk, "Bog beyond Possil," 1813.
- \* *S. alsine* Murr.  
Hopkirk, "In the bog beyond Possil," 1813.
- Sagina procumbens* Linn.
- S. nodosa* (L) Fenzl.  
Hennedy. B.A.F.  
Not now in Possil Marsh.
- Spergula arvensis* Linn.
- Montia verna* Necker.  
B.A.F.
- M. lamprosperma* Chamisso.  
Hennedy.
- Hypericum humifusum* Linn.  
B.A.F. Not now found.
- \* *Radiola linoides* Roth.  
Hennedy "Possil Marsh in a cutting." Turner. B.A.F.  
G.U.B.D. Herb. Spec., by Gasper J. Lyon, 1836.  
Not now in Marsh.
- Geranium robertianum* Linn.
- Trifolium pratense* Linn.
- T. medium* Huds.
- \* *T. dubium* Sibth.
- T. repens* Linn.
- Lotus corniculatus* Linn.
- L. uliginosus* Schkuhr.
- Vicia sepium* Linn.
- Lathyrus pratensis* Linn.
- Filipendula* (*Spiraea*) *ulmaria* (L) Maxim.
- Rubus idaeus* Linn.
- R. fruticosus* Linn (agg.)
- Potentilla erecta* (L) Räusch.  
Hennedy.
- P. anserina* Linn.
- P. palustris* (L) Scop.  
Hennedy.
- Alchemilla vulgaris* (Agg.).
- Rosa canina* (Agg.).
- Crataegus monogyna* Jacq.



*Parnassia palustris* Linn.

Hennedy. B.A.F. But no longer at Marsh.

*Drosera rotundifolia* Linn.

"Possil Marsh—Yesterday and Today."—"To me the most noticeable loss is the Sundew. Hennedy, 1865-1890 records it . . . In 1910 I first seriously noticed it becoming fewer and fewer . . . In 1918 about two score were planted. . . . In 1919 a magnificent show, but unfortunately Sphagnum Moss collectors removed many . . . In 1920 less than a dozen plants. In 1925 the stock was renewed and again they gradually disappeared." "In 1929 a new lot was introduced and in 1930 there was a gorgeous display. Moss collectors again appeared. No sundew seen in 1931. One plant was found in 1932 . . . the last."

\* *Hippuris vulgaris* Linn.

Hopkirk, 1813—no mention.

Patrick, 1831—"In the bog beyond Possil, N. of Glasgow."

Hennedy.

Introduced into Possil Marsh since canal.

*Callitriche verna* L-em Lönnr.

Hennedy.

*Epilobium montanum* Linn.

*E. palustre* Linn.

Hennedy. Not so plentiful as formerly.

*Chamaenerion (Epilobium) angustifolium* Linn.

Rennie, "Planted—not by accident, but by design."

*Astrantia major* Linn.

B.A.F. Not now in area.

*Hydrocotyle vulgaris* Linn.

Hennedy.

*Apium inundatum* (L) Rchb. f.

No longer in Possil Marsh.

\* *Berula erecta* (Huds.) Coville.=*Sium erectum* Huds.

Introduced from Loch Libo to Possil Marsh by W. Rennie, 30/3/1919—See "Possil Marsh—Yesterday and Today."

*Aegopodium podagraria* Linn.

*Anthriscus sylvestris* Linn.

*Angelica sylvestris* (L) Bernh.

*Oenanthe crocata* Linn.

Not seen in the Marsh after 1928.

*Heracleum sphondylium* Linn.

*Gallium verum* Linn.

*G. hercynicum* Weigel.=*G. saxatile* Linn.

*G. palustre* Linn.

Hennedy. F. G. Binnie in "Proc. N.H.S. Gw. III." p. 182.  
1877.

*G. palustre* Linn. var. *witheringii* Sm.

Hennedy.

*Valeriana officinalis* Linn.

*Succisa pratensis* Moench.=*Scabiosa succisa* Linn.

*Bellis perennis* Linn.

*Antennaria dioica* (L) Gaertn.

*Gnaphalium sylvaticum* Linn.

Hennedy. B.A.F. Has not been seen for some years.

*G. uliginosum* Linn.

On N. side of ditch.

*Achillea millefolium* Linn.

*A. ptarmica* Linn.

*Chrysanthemum leucanthemum* Linn.

N. side of ditch.

*Matricaria inodora* Linn.

*M. matricarioides* (Lees) Porter.

*Tussilago farfara* Linn.

*Senecio vulgaris* Linn.

*S. viscosus* Linn.

*S. jacobaea* Linn.

*S. aquaticus* Hill.

*Cirsium vulgare* (Savi.) Ten.

*C. arvensis* (L.) Scop.

*C. palustre* (L.) Scop.

Hennedy.

*Centaurea nigra* Linn.

*Hypochoeris radicata* Linn.

*Taraxacum palustre* Lam. and DC.

*T. officinale* agg.

*Vaccinium myrtillis* Linn.

*Oxycoccus palustris* Pers.

Long ago Rennie tried unsuccessfully to introduce it;  
but some one else has since succeeded. A recent intro-  
duction.

*Calluna vulgaris* (L.) Hull.

*Pyrola minor* Linn.

B.A.F. But disappeared when the beech trees were cut  
down.

\* *Naumburgia (Lysimachia) thyrsiflora* (L.) DC.

In Smith's "Flora Britannica," 1800, we read :—" On the edge of a lake to the north of Glasgow." Turner thinks this refers to Possil Marsh. He says, " It was probably introduced into Possil Marsh through the medium of the Canal in which it is profuse."

1813. Hopkirk looked for it in vain in " all lakes near Glasgow."

1831. Patrick records it from Canal Bank, Castlecary. In the Herbarium of Glasgow University Botany Dept., are specimens collected as under :—

- ... Walker Arnott  
Canal near Glasgow.  
7/1841 ... F. M. Adamson,  
Kirkintilloch.  
3/6/1891 ... R. Kidston and J. S. Stirling,  
F. and C. Canal, Greenhill.  
28/8/1837 ... Trinity Coll. Collect.,  
Banks of Canal, Possil.  
7/1841 ... Wm. Gourlie, Jr.,  
Possil Marsh.  
6/1883 ... Dr. J. Wylie,  
Possil Marsh.  
28/6/1892 ... R. and T. Wilkie,  
Possil Marsh.  
9/1919 ... D. Patton,  
Possil Marsh.

In 1855 Hooker and Arnott record it from the Canal-side near Possil. From Possil Marsh it is also recorded by Henedy, B.A.F., and by J. R. Lee in his " Flora of the Clyde Area," 1933 ; and it is still in the Marsh.

\* *Menyanthes trifoliata* Linn.

Henedy. B.A.F.

*Myosotis caespitosa* K. F. Schultz.

\* *M. palustris* Linn. ssp. *palustris*.

*M. secunda* Murr.=*M. repens* Don.

*M. discolor* Pers.=*M. versicolor* Reich.

*Mimulus luteus* Linn.

Near outflow. Introduced.

\* *Veronica arvensis* Linn.

\* *V. serpyllifolia* Linn.

*V. chamaedrys* Linn.

\* *V. scutellata* Linn.

1831. Hopkirk " In the bogs Kenmuir and Possil."

Henedy. B.A.F.

\* *V. beccabunga* Linn.

*Euphrasia officinalis* agg.

On N. side of ditch.

\* *Pedicularis palustris* Linn.

*P. sylvatica* Linn.

*Rhinanthus minor* agg.

N. side of ditch.

*Utricularia minor* Linn.

1813. Hopkirk—no mention.

Hennedy, B.A.F. and J. R. Lee.

Introduced to Possil Marsh from canal, or re-introduced by Rennie.

*U. vulgaris* Linn.

1813. Hopkirk, "Deep hole in the marsh, Possil."

B.A.F. But no longer in the Marsh.

*Pinguicula vulgaris* Linn.

Near the ditch at Lambhill Road-end.

*Mentha aquatica* Linn.

\* *M. sativa* Linn.

*Prunella vulgaris* Linn.

\* *Stachys palustris* Linn.

*Galeopsis tetrahit* Linn.

*G. speciosa* Mill.

*Lamium purpureum* Linn.

*Plantago lanceolata* Linn.

*P. major* Linn.

*Chenopodium album* Linn.

*Polygonum convolvulus* Linn.

*P. aviculare* Linn.

*P. persicaria* Linn.

*P. amphibium* Linn.

*Rumex crispus* Linn.

*R. acetosa* Linn.

*Betula alba* Linn.

Exhibited by Mr. Forsyth—see minutes of Glas. East.

Bot. Soc. 6.6.1877. Now cut down.

*Humulus lupulus* Linn.

Hopkirk. 1813. "In the plantains, Possil." Now absent.

*Urtica dioica* Linn.

*Salix*

John R. Lee in "The Willows of Possil Marsh" in Annals of And. Nat. Soc. Vol. IV., p. 106, records:—

"*S. cinerea* Linn., *S. aurita* Linn., *S. Andersoniana* Sm.=  
*S. nigricans* Sm.,



*S. repens* Linn., *S. pentandra* Linn., *S. aurita* × *cinerea*,  
*S. nigricans* × *phylicifolia*, *S. cinerea* × *phylicifolia*,  
*S. cinerea* × *nigricans* and *S. aurita* × *repens*."

*Elodea canadense* Michx.

Introduced into Possil Marsh since the canal.

Proc. N.H.S. Gw. II., p. 163, 1871. Jas. E. Dixon.  
 B.A.F.

*Orchis mascula* Linn.

*O. strictifolia* Opiz.

*O. praetermissa* Druce.

J. R. Lee in "Flora of Clyde Area."

*O. purpurella* T. & A. Steph.

J. R. Lee, "Very plentiful in Possil Marsh."

*Platanthera bifolia* (L.) L. C. Rich.

*P. chlorantha* (Cust.) Rehb.

*Iris pseudacorus* Linn.

*Narthecium ossifragum* (L.) Huds.

*Juncus squarrosus* Linn.

*J. inflexus* L. = *J. glauca* Sibth.

Hennedy, footnote, "fide D. Farquhar."

*J. conglomeratus* Linn.

*J. uliginosus* Sibth.

\* *J. bulbosus* Linn.

*Typha latifolia* Linn.

\* *Sparganium ramosum* Huds.

*S. simplex* Huds.

Hennedy. B.A.F.

\* *Lemna minor* Linn.

\* *L. trisulca* Linn.

Hopkirk—1813—no mention.

Hennedy, "Very plentiful in Possil Marsh." B.A.F.

Introduced into Marsh since canal.

*Alisma plantago-aquatica* Linn.

*Baldellia* (*Alisma*) *ranunculoides* (L.) Parl.

Hopkirk—1813—"Marsh beyond Possil."

Patrick—1831—"In the Marsh beyond Possil."

Turner—1885—"No longer in Possil."

\* *Butomus umbellatus* Linn.

Lee in "Flora of Clyde Area."

\* *Triglochin palustre* Linn.

- Potamogeton polygonifolius* Pourr.  
*P. alpinus* Balb.  
*P. gramineus* Linn.  
*P. obtusifolius* M. & K.  
*P. pusillus* Linn.  
*Schoenoplectus (Scirpus) lacustris* (L.) Palla.  
 Hopkirk—1813—"In the Marsh beyond Possil."  
 Henedy, B.A.F., and Glas. Nat. XV., p. 79. 1945.  
*Isolepis setacea* (L.) R. Br.  
 Henedy and B.A.F.  
 \* *Eriophorum angustifolium* Honck.  
*E. vaginatum* Linn.  
*Carex pulicaris* Linn.  
*C. disticha* Huds.  
 Lee in "Flora of Clyde Area."  
 \* *C. echinata* Murr.  
 \* *C. curta* Good.  
 \* *C. lachenalii* Schkuhr.  
 \* *C. elata* All.  
*C. nigra* (L.) Reichard=*C. vulgaris* Fries.  
*C. flacca* Schreb.  
*C. panicea* Linn.  
*C. flava* Linn.  
*C. rostrata* Stokes.  
*C. vesicaria* Linn.  
 Hopkirk (1813) and Patrick (1831). "In the bog Possil."  
 Henedy and B.A.F.  
*C. diandra* Schrank.=*C. teretiuscula* Good.  
 Richard McKay exhibited it from the E. end of the  
 Marsh. Proc. and Trans. N.H. Soc. Gw., Vol. I. (N.S.)  
 p. iii. 1883.  
*Anthoxanthum odoratum* Linn.  
 \* *Alopecurus geniculatus* Linn.  
*A. pratensis* Linn.  
*Deschampsia caespitosa* (L.) Beauv.  
*Holcus lanatus* Linn.  
*Sieglingia decumbens* (L.) Bernh.  
 Henedy "Dry portions of Possil Marsh."  
 \* *Phragmites communis* Trin.  
 Glas. Nat. XV. p. 79. 1945.  
*Poa pratensis* Linn.

*P. annua* Linn.

\* *Glyceria fluitans* (L.) R. Br.

\* *G. maxima* (Hartm) Holmb.

*Festuca bromoides* Linn.

Hennedy "Dry places in Possil Marsh."

*Dactylis glomerata* Linn.

*Bromus thominii* Hard.

\* *Lolium perenne* Linn.

\* *Nardus stricta* Linn.

*Ophioglossum vulgatum* Linn.

B.A.F. p. 83. Possil? No signs of it now.

*Dryopteris filix-mas* (L.) Schott.

*Equisetum palustre* Linn.

\* *E. fluviatile* Linn.

*Nitella flexilis* Agardh.

Hopkirk. "Ditch at Possil Marsh." 1813. Still there.

The above list comprises 216 plants. Of these 18 have disappeared from the Marsh, 12 have been successfully established, 6 from the Canal, 5 by man (intentionally) and 1 by birds.

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## ENDEMICISM IN THE SNAILS OF JAMAICA

By W. RUSSELL HUNTER

(Read 9th November, 1954, forming part of a lecture entitled  
"One view of Jamaica")

---

The variety and abundance of land snails in the larger islands of the West Indies has long been recognised and discussed (see *e.g.* Cooke, 1895 ; Simroth, 1896-1907). The present note summarizes certain aspects of the snail fauna of Jamaica :

(a) the very high proportion of forms which are found only in (*i.e.* are endemic to) the Greater Antilles ;

(b) the high proportion of forms which are endemic to the island of Jamaica itself ;

(c) the unusual degree of radiating speciation, which has resulted in a higher number of terrestrial species than is known from any comparable area elsewhere in the world ; and

(d) the relatively low proportion of the fauna filled by the group of families which form the dominant land snails of the rest of the world, and the greatly increased importance of certain other groups. The note then comments upon certain peculiarities of environment with which these faunistic developments may be connected, though a detailed casual analysis is not yet attempted.

The nomenclature of Thiele (1931) is adopted as standard here, although the classifications used in certain parts of that work are known to be misleading in relation to phylogeny.

Numerical proportions and percentages of species mentioned here should only be regarded as relative ; absolute numbers cannot be assessed. The modern conception of a species as a group of actually (or potentially) interbreeding natural populations, which group is reproductively isolated from other such groups of populations (Mayr, 1940 ; Mayr, Linsley and Usinger, 1953) cannot, for lack of detailed information, be applied to the greater part of the snail fauna of Jamaica. Well-defined species are normally characterized by (a) reproductive isolation ; (b) morphological differences ; (c) physiological differences apart from those involved in a, and (d) ecological differences. The material on which any discussion of snail species in Jamaica can be based is still largely shell collections, which lack information on most of these points. Material from the author's small personal collections has been largely supplemented by examination of the collections of Jamaican land shells in the Museum of the



Institute of Jamaica, Kingston, and in the British Museum (Natural History). The author is indebted for help in these institutions to Mr. C. Bernard Lewis and Mr. G. L. Wilkins respectively. Use has been made of a photostat of a catalogue (Chitty-Adams MS, 1853) prepared in 1851-3 by the Hon. Edward Chitty, barrister and author of legal texts, who had been resident in Jamaica for thirteen years, and Professor C. B. Adams, the famous American conchologist from Amherst College who paid several visits to Jamaica about that time. The catalogue lists the shells sent by them to the collections of the British Museum. An attempt has been made to follow a mean path between excessive conservatism in numbering species and genera, and excessive subdivision (*i.e.* between the activities of "lumpers" and "splitters"). Numbers for species of land snails can probably have more objective reality than numbers for snail genera. With land snails, as is the case with birds (Mayr, 1949) and several other groups of living animals, the delimitation of species is less a matter of subjective opinion than the delimitation of genera, though most palaeontologists and many botanists consider the genus to be the more strictly definable category of greater objective reality.

In *all* the temperate regions of the world, and in certain tropical and subtropical areas, most land snails belong to the Order STYLOMMATOPHORA of the Subclass PULMONATA, and the greater part are species which belong to about eight families (of which the Helicidae is in many respects the most important). But, apart from the PULMONATA, a variety of unrelated families of snails have colonized land. These snails belonging to the Subclass PROSOBRANCHIA (which also includes the most primitive marine gastropods), mostly retain an operculum closing the aperture of the shell, and are often spoken of collectively as the "operculate" land snails (though they are obviously polyphyletic, having evolved from very distinct groups of marine ancestors).

A recent assessment of Winckworth (1950) considers the snail faunas of the world as a whole, and gives 133 genera of operculate land snails, with approximately 4,000 species. against 667 genera of pulmonates with 15,000 species. In Great Britain there are probably 103 species of pulmonate land snails and only two species of terrestrial operculates. This proportion is not atypical of temperate land areas. In Jamaica there may be 450 ( $\pm 100$ ) species of land snails, of which only about half are pulmonate. This proportion of species is roughly similar in Cuba and in Hispaniola, but nowhere else in the world are operculate species so numerous.

Some of the most interesting operculates in Jamaica belong to the NERITACEA, a group of the gastropods considered by Thiele (1931) as a Suborder\* of the most primitive Order of the GASTROPODA. As the anatomical studies of Bourne (1908, 1911) first showed, and as recently discussed on functional grounds by Yonge (1947), this group (including marine, freshwater, and land forms) has evolved completely independently of—though occasionally parallel to—the rest of the gastropods. Though the point will not be elaborated here, this independent evolution might well be expressed taxonomically by considering the NERITACEA as a separate Order or even Subclass of the GASTROPODA. In Jamaica the most important genera of neritacean land snails, placed in the family Helicinidae, are *Alcadia*,† *Helicina*, *Lucidella*†, *Stoastoma* and *Eutrochatella*†, which together probably number nearly 120 Jamaican species, about 70% of which are endemic to the island. Also neritacean, but less closely related are a few species belonging to the Proserpininae†, a group limited to Central America and the Antilles, in which the operculum is lost and folds of the mantle cover the shell.

The remaining genera of operculate land snails of Jamaica fall into three very divergent groups. The first is regarded as including some of the most primitive members of the Order MESOGASTROPODA and are placed by Thiele (1931) in the family Cyclophoridae of the most primitive Suborder therein. According to Thiele, the Jamaican species are placed in the genera *Poteria*† (*Neocyclotus*), *Poteria s.s.* and *Crocidopoma*, and may number from 30 to 36 separate species. This family provides a good illustration of the difficulties of assessing numbers of species or degree of endemism on conchological evidence. The family has been recently monographed (Bartsch, 1942), but the revision was based largely on shell collections. In contrast to the figures given above (drawn from Thiele, 1931; Adams, 1849-52; Chitty, 1857; and the Chitty-Adams MS, 1853), Bartsch numbers 78 Jamaican species for this family and places some of them in genera considered to be totally endemic to Jamaica (e.g. *Cyclojamaicia*, *Cycloendreyisia*, and *Cyclopilsbrya s.s.*).

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\* For the taxon "*Stirps*" used by Thiele (1931), the category *Suborder* is adopted here. Certain authors have used the term *Tribe* for Thiele's *Stirps*, but according to recent usage this is erroneous (Mayr, Linsley and Usinger, 1953; see also the *Regles Internationales de la Nomenclature Zoologique*), the category *Tribe* being Intermediate between *Subfamily* and *Genus*. Thiele's taxon was used between *Order* and *Family*, i.e. it must correspond to *Superfamily* or *Suborder*.

† See footnote on p. 177.

A further group of genera are placed in the Suborder LITTORINACEA, which also includes the family Littorinidae—the world-wide family of intertidal periwinkles. Within this group, the Jamaican genera of land snails are placed by Thiele in the family Pomatiasidae (family Annulariidae of Henderson and Bartsch, 1920). There are probably about 60 species, more than half of them being endemic, in such genera of Thiele's as *Tudora*†, *Jamaicia*, *Adamsiella*, *Chondropoma*, and *Choanopoma*. The work of Bartsch (1946) on the annulariids of Hispaniola, and of de la Torre and Bartsch (1938, 1941) on those of Cuba, would suggest that these figures *could* be considerably revised upwards.

A fourth group of species of terrestrial operculates in Jamaica belong to the family Hydrobiidae (*i.e.* within the Suborder RISSOACEA of Thiele, 1931), which also includes certain European estuarine and freshwater genera. In Jamaica there are about 20-25 species, probably all endemic, and placed in several subgenera of *Geomelania*: *Scalatella*, *Chittya*, and *Geomelania s.s.*

The high degree of endemism shown by the operculates is found (though on a lower taxonomic level, and less universally) among the stylommatophorous PULMONATA of Jamaica; and extreme radiation around the species level is again found. Although numerically abundant, it is probable that the slugs present in Jamaica belong to only two species of *Vaginula*† (*Veronicella* of some authors), the more highly organized slugs (*e.g.* Limacidae and Arionidae) being entirely absent. This is not peculiar to Jamaica but is the case throughout the Neotropical region. *Vaginula* has a distribution through the tropics, and is placed by Thiele (1931) in one of the most primitive (or aberrant) Suborders of the Order STYLOMMATOPHORA (Suborder SOLEOLIFERA).

A few other Jamaican pulmonates belong to cosmopolitan genera: for example, there are a few species belonging to the genera *Pupilla* (Suborder VERTIGINACEA) and *Succinea* (Suborder SUCCINEACEA), which appear to live in Jamaica in habitats ecologically similar to those inhabited by their congeners in Britain, and indeed throughout the world. Similarly, a few species in Jamaica belonging to the common North American genera of the family Zonitidae (Suborder ZONITACEA), are found in similar habitats to the closely related *Oxychilus* spp. of Europe.

Apart from these, however, the majority of Jamaican pulmonate species belong to a restricted number of families. Perhaps the most striking are the very large species placed in the family Pleurodontidae (Suborder HELICACEA), a family



whose greatest number of species is Jamaican. Several subgenera of the genus *Pleurodonte* are entirely endemic, and others are shared only within the Greater Antilles. There may be about 36 Jamaican species in this group, all of which are probably specifically endemic. A similar group of species belong to the family Sagdidae (Suborder ZONITACEA), a family almost limited to Central American and the West Indies. There are probably about 30 Jamaican species, nearly all endemic, and having congeners only in Cuba and the south-west part of Hispaniola. They are included in such genera as *Hojeda* (= *Microphysa*), *Thysanophora*, *Sauvitas*, *Lacteoluna*, *Hyalosagda*, *Sagda* and *Zaphysema*. One allied genus, *Proserpinula*†, shows a remarkable similarity in form and habit to species of the genus *Proserpina* which live alongside it in Jamaica. Only close examination reveals whether the specimens of these snails belong to the sagdid PULMONATA, or are highly evolved NERITACEA. These two genera, from widely separate stocks of gastropods, exhibit an extreme degree of evolutionary convergence: their habits appear to be similar, and the extensible mantle seems to have the same texture and pigmentation in both genera. A further family showing a high degree of endemism is the Urocoptidae (Suborder BULIMULACEA). Jamaican species may number about 50, most of which are endemic, and are placed in the genera: *Microceramus*, *Anoma* (= *Leia*), *Spirostemma*, *Urocoptis* and *Brachypodella*. In most cases the subgenera involved are endemic to Jamaica, and the genera to the Antilles.

One group of Jamaican pulmonate snails are predatory carnivores—feeding almost exclusively on other land snails, including species of *Pleurodonte*, some twenty times their size by weight. These are placed in the family Oleacinidae, which family is allied with the family Testacellidae, which includes the carnivorous slugs of Europe, in the Suborder OLEACINACEA. There are approximately thirty Jamaican species in the genera *Spiraxis*, *Pichardiella*, and *Varicella* (= *Melia*).

It is perhaps worthy of note that two of the most successful and abundant species of snails in the cultivated parts of Jamaica are almost certainly recent introductions to the island. *Oxystyla* (= *Zebra*) *undata*, though present about the middle of last century (Chitty-Adams MS, 1853), is a species typically found in Central and South America, belonging to the family Bulimulidae. More recently, a species of the genus *Strophochilus* (family Strophochilidae, Suborder ACAVACEA) from tropical South America has been introduced, and has rapidly

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† Acccounts are being prepared on certain aspects of the ecology and functional biology of snails marked thus in the text, and it is hoped to publish these elsewhere.



become a pest in gardens and plantations in some areas. Mature specimens are among the largest land snails in the world, and they lay eggs with hard calcareous shells which are considerably larger than the eggs of some humming-birds.

In contrast to the unique fauna of land snails in Jamaica, the freshwater molluscs belong mainly to cosmopolitan genera. Possible exceptions are species of ampullariid and melaniid freshwater operculates, which however have close congeners in continental America. This characteristic of freshwater molluscan faunas being largely made up of a small number of genera, world-wide in distribution though with species showing a very high degree of infra-specific variation, is discussed elsewhere (Hubendick, 1954; Hunter, 1955) and is undoubtedly connected with the transitory nature of the environment provided by most bodies of freshwater (Hunter, 1952).

For reasons noted above, it is not easy to sum up the degree of endemism shown by the land snails of Jamaica as a whole. Possibly 80 - 90% of species are endemic to Jamaica, and at a generic to subgeneric level (by very subjective assessment) it is not improbable that 15% endemism occurs within Jamaica and 30 - 40% within the Greater Antilles. Factors both of environment and of geological history elicit this endemism. Environmentally, climate and solid geology are important, both directly and through their effects on soil and vegetation. The climate of Jamaica is tropical but insular: temperatures being high (annual mean approx. 80°F. at sea level), but relatively constant (average range only about 15°F.). Range in altitude within the island (the Blue Mountains reach 7,402 ft., and about half the island area lies above 1,500 ft.) affects temperatures (annual mean for Blue Mountain Peak 56°F.), but controls the rainfall even more markedly. Throughout the year, Jamaica lies in the path of the moisture-laden trade winds (East to ENE). As a result of this and the relief of the island (the John Crow Mts. and Blue Mts. form a highland core to the eastern part of the island), three climatic regions are produced: a rainy windward coast, a cooler central highland region, and a dry leeward coast. Annual rainfall in fact ranges from 275" on the slopes of the John Crow Mts. to less than 30" over several stretches of the south coast. In the latter cases desert conditions result—the rate of evaporation from the soil being in excess of the rate of rainfall for most of the year. Geologically, Jamaica has a core of igneous and metamorphic rocks (doubtfully Lower Mesozoic, but certainly of pre-Tertiary age), surrounded by a series of marine limestones deposited during periods of submergence which alternated with successive elevations from

the Cretaceous period onwards. The present surface rocks of Jamaica range through hard white limestones (over 55% of the island area), more rapidly eroding yellow limestones (10%), shales and igneous rocks of pre-Tertiary age (20%), and more recent alluvial deposits (15%). Over these lie a wide range of soils (Hardy, 1951), which (as regards snails) vary greatly in organic content, and from highly calcareous soils rich in plant nutrients to acid conditions where leaching is rapid. Asprey and Robbins (1953) have recently published a survey of the vegetation of Jamaica, and points therein are of importance in relation to the snail fauna. First is their evidence for the greater extent of forests, including characteristic lowland tropical rain forest, in the period before European occupation (*i.e.* before 1509). Second is the variety of natural vegetation-types which persist. These include as facies of tropical rain forest: "mist forest" at heights of 4,500 ft. and upwards in the mountains, "lower montane rain forest," and "wet limestone forest," the last mainly in the Karst scenery and great bowl-shaped depressions (or *dolinas*) of the Cockpit Country. Other vegetation types of importance include, on the one hand the "dry limestone scrub forest" and "cactus-thorn scrub" and, on the other "palm-sedge marsh and marsh forest" and "mangrove woodland." As regards the land snails, it is worth noting that all the facies of rain forest (but perhaps "mist forest" most extremely) provide conditions of very high humidity and lowered light intensity. These permanently muggy hothouse conditions, which allow the extensive growth of epiphytes with aerial roots, also provide habitats in which land snails can move around without risk of dessication at all times of the day and throughout the year. Also of importance to the present problem, is the great variety of habitats provided for snails by the various vegetation zones within the island of Jamaica. The lack of native mammals in Jamaica is significant—the introduced mongoose being now a considerable predator of large land snails such as *Pleurodonte*.

The geological history of the Caribbean area, and particularly the history of land connections among the Greater Antilles and between them and continental America, is still largely controversial, the evidence both of geomorphology and of biogeography being incomplete. The hypotheses have been summarized by Schuchert (1935). It is generally agreed that no land connections ever linked the Greater Antilles to either Florida or continental South America. Land bridges may have linked the Honduras peninsula of Central America to the Antillean region in the Upper Miocene, and before that in Eocene/Oligocene, and some evidence (not Schuchert) suggests a late Tertiary or Quaternary link between the peninsula of

Yucatan and western Cuba. Throughout the Tertiary epoch periods of elevation alternated with periods when most of the Greater Antilles were submerged; Jamaica has probably not been completely submerged since the middle of the Miocene, in Upper Miocene it may have been connected to Honduras, and probably to other Greater Antilles. The present separate island probably existed through the Pleistocene and the greater part of the Pliocene periods. Since much of the most important evidence on land bridges must be derived from the present distribution of animals and plants, care must be taken to avoid reasoning in a circle. However, it is noteworthy that the present pattern of distribution of land snails in the Greater Antilles and adjacent land areas shows close parallels in certain respects to the distribution of plants (Asprey and Robbins, 1953), and of reptiles (Underwood, 1954, and personal communications), though it differs in detail in several ways. On the most general level, Antillean snail faunas share several subfamilies and genera with Central America, rather less with tropical South America, and very few with continental America north of the Tehuantepec isthmus. Similar degrees of affinities are found in the reptile faunas. More detailed resemblances also occur: certain subgenera of pulmonate snails of the family Sagdidae are limited to the south-west peninsula of Hispaniola and to Jamaica, which is exactly the distribution (Underwood, personal communication) of the genus *Xiphocercus* of iguanid reptiles. On the other hand, the snail faunas of Cuba and Hispaniola show greater affinities within restricted genera, than do the reptile faunas.

Radiating speciation in certain generic stocks, for example, *Stoastoma*, *Poteria*, and *Geomelania* among the Jamaican operculates, and *Pleurodonte* and *Urocoptis* among the pulmonates—as well as the high proportion of operculates in the fauna—suggests the original isolation of a relatively limited number of stocks (with consequent reduction in competition). To some extent the situation is analogous to the adaptive radiation shown by the marsupial mammals of Australia, isolated from late Cretaceous to Recent periods, or the edentate mammals of South America from Eocene to Pliocene/Pleistocene. Apart from the mammals, the best documented case of this type of evolution concerns the groundfinches of the Galapagos Islands (Swarth, 1934; Lack, 1947) which were first noted by Darwin. From a presumed Fringillid ancestral species, individuals of which must by chance have been the first birds to colonize the islands, a series of birds with a wide variety of food habits and including forms living like tits, woodpeckers, and warblers, have been evolved filling particular ecological niches as a result of the chance absence of competition from their more



usual occupants. Even more widespread radiation is shown by certain birds in the Hawaiian archipelago, notably the sicklebills (Gulick, 1932). Unfortunately, data on the ecology of the majority of land snails in Jamaica are still scanty, so that in most cases the ecological background to species differentiation remains obscure. Apart from the speciation resulting from adaptive divergence for particular habitats and modes of life, effective reproductive separation of populations by geographical discontinuity of a habitat may have played a part in species differentiation within the Greater Antilles. The most remarkable cases of this type of species formation in land snails have been reported from islands in the Pacific, notably from the Society Islands, where different species of *Partula* occur in each wooded valley (Crampton, 1925), the mountainous ridges between the valleys, and the dry coastal strip below them, being sufficient to isolate genetically the populations within them. Similar speciation has occurred in snails of the family Achatinellidae in the Hawaiian group. While such extreme spatial separation may not occur within Jamaica, nevertheless there are isolated blocks of limestone country, and "wet" areas separated by country with low rainfall and xerophytic vegetation. Again relevant data for Jamaican snails are scanty: little being known about the detailed distribution within the island of any species. Exceptions to this could be the cases of several cyclophorids (see Bartsch, 1942) and of *Pleurodonte chemnitziana*, a large and striking pulmonate species not likely to be missed by collectors, which may well be limited to regions north-east of the Corn Puss Gap in the limestone mountains of the John Crow range.

To sum up—the peculiarities of the fauna of land snails in Jamaica (and in the Greater Antilles generally) may result from:—

(a) The provision there of a climatically and geologically "good" environment for snails, greatly subdivided into various ecotopes;

(b) original colonization by a limited number of ancestral forms; and

(c) isolation, perhaps from late Miocene onwards.

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## BEN LAWERS—PAST AND PRESENT

By JOHN R. LEE and DONALD PATTON

(*Read 12th October, 1954*)

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The interest of this Society in the special field of study offered by the Ben Lawers range of mountains may be said to date back to a very early stage in the Society's history, for, although its activities were mainly concerned with the Clyde area, there were from its earliest days many individual members to whom the arctic-alpine flora made special appeal, and who had become acquainted at first hand with the Ben: (Prof. G. A. Walker Arnott, Wm. Gourlie, Jr., Dr. Kidston, Dr. Stirton—to name a few). The former Natural History Society of Glasgow, however, did not undertake regular excursions for such study in groups to any great extent, relying rather upon exhibits by its members from time to time and accounts of individual observations given in reports and papers dealing with the results of such. Much valuable work of this kind stands recorded in the minutes of the Society in these early days. But it was only in later times that the Society, as a whole, began to organise excursions for the study of arctic-alpine plants in particular; thus creating among a section of the membership a bond of common interest which over a series of years became a deep and lasting friendship as well as a stimulus to further study and a source of undying interest.

In this development full credit must be given to the energy and initiative shewn by members of the Andersonian Naturalists' Society which, from its inception, made the summer excursions programme the most important part of its activities, and did not restrict itself to its own immediate territory for field work. Thus it is not surprising that, after a few years, the idea of devoting one day, or more, during the July holidays to an outing to the mountains, should have suggested itself. The first of such outings to Lawers district was in 1892, when a considerable party led by the late Mr. Hugh Boyd Watt spent a "Fair Holiday" week-end at the Bridge of Lochay Hotel, near Killin, the main objective being an ascent of Ben Lawers on the Saturday. This outing, although it was not attended by any one claiming special knowledge of the flora of the Ben, was nevertheless a huge success, and gave an impetus to the



idea of "alpine" excursions which were held, over a number of years to various other localities convenient to the mountains.

It was not, however, till six years later that another special excursion to Ben Lawers took place, led by the late Peter Ewing, F.L.S., a well-known Lawers expert. This time the ascent was made via the Carie Burn, Mr. Ewing leading the party to the foot of the crags and then diverting eastwards towards the bottom of the "Ordnance Ravine" (his favourite method of approach), ascending to the summit and returning down the "Western Ravine." Naturally, on this occasion, the "finds" were much more numerous and interesting. There was, however, a gap of eleven years before the "Alpine" excursion again was officially planned for Ben Lawers; but during this interval many members not only paid individual visits to the Ben, but became practically acquainted with its rich flora, became in fact "Lawers specialists."

In 1909, then, the next outing specifically devoted to the district was arranged, a fairly large party of members joining in a week's stay at Killin for a series of ascents of the near-by hills including Ben Lawers. Mr. Ewing was spending his summer holidays in Killin at the time, and his extensive knowledge and experience were of the greatest value in making the excursions highly successful. The immediate result of this was a determination that in the following year a similar gathering should be held, this time at Lawers, for a detailed exploration of the Ben itself. This time—July, 1910—the members gathered in Ben Lawers Hotel; and, before the first ascent began, the party was photographed in front of the hotel, and the picture has been preserved as a cherished memento of what may be said to be an historic occasion in the memory of the few remaining of those who took part in the outing.

Some of the party had already acquired some knowledge of the special plants to be seen on the Ben; but there were many rarities which we all knew were still to be found; and it was with high hopes that we set out, eager to discover some. Mr. Ewing, who was at Killin, did not join in this first ascent, wisely deciding that we were better left to explore for ourselves. He, of course, knew the flora intimately; but there were certain items in it that were, by common consent among the experts, kept secret till discovered by the novice for himself. We did not expect, however, that any such startling result should fall to be ours on this first occasion; we should



be content to add a few of the already well-known occurrences of rare plants to our own lists of observations. But strange things do happen.

There was staying at the hotel when we arrived a visitor, not of our party, who had come for the fishing. He was not a botanist and said he had no knowledge of the things in which we were interested ; but he was of a sociable disposition, and asked if he might join in our ascent of the mountain, at least for part of the way—a suggestion we all accepted. At a part of the hillside from which a fine view of Lochan a' Chait is obtained, our friend—attracted by the piscatorial possibilities suggested by the view—bade us au revoir and made his way towards the lochan, while we continued the ascent to the top. We did not see him again until our return to the hotel in the late afternoon, when he produced from his coat pocket a fair handful of something he said he had gathered on his way, and that he thought might possibly interest us. The plant was evidently a saxifrage of some sort ; but no one in the company was certain about it, and a suspicion arose that it might be some unusual form of the rare species which we all knew as being the one thing confined to Ben Lawers as its only British Station. A feeling of horror and indignation was at first aroused at the thought of such an act of something like vandalism, albeit quite unintentioned ; and some reproachful things were both thought and said. Most of us made up our minds that it could not be helped, and we retired for the night, mostly dismissing the matter from our minds. One member of the party, however, with whom I\* was sharing a room, before going to bed, had another look at the doubtful plant and said he was not at all satisfied about its identity with the rare one we all knew. We, therefore, spent some time examining the specimen, going over it carefully and comparing it with Hooker's Flora. We were not long in finding that we had a prize of first class interest and importance. Our fisherman had, in fact, on his way down to the lochan, struck the unlikely spot where grows the rarest plant perhaps so far as Ben Lawers is concerned—

### *Saxifraga rivularis* L.

Eager enquiries were next morning made to our angler friend as to the exact locality where he had found the prize ; and with a remarkable goodwill, considering the remarks we had made on the previous evening, and with considerable amusement at our now intense interest, he told us very clearly and exactly the precise location of the plant. Half-a-dozen members of the party at once set off and visited the spot

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\* John R. Lee

which, from that moment became one of the best known and highly valued places firmly fixed in all our memories. Mr. Ewing came along later in the day and was duly informed of our success and of the events leading up to it. He, who had long known the locality of the plant, congratulated us.

This incident, naturally, gave to the excursion a value in our minds which led to the starting of a long series of annual gatherings at Lawers of some of the members who had been present on this occasion.

At the foot of Ben Lawers, where the roar (Labhar) of Lawers Burn, muffled by the Sithean Woods, can be heard at all seasons except the driest, stands the old, yet modernised, and hospitable Ben Lawers Hotel already mentioned. Like the Ben itself, one visit to it leads to many. Even after youthful limbs grow old and can no longer make for the summit, veterans of the Ben gather round the lounge fire "and talk the night away," recounting past episodes. James Jack of Airdrie, just before he died, paid a visit to the area to see the mountain with its accompanying scenery and to take his "comfort at the Inn." He had been one of the "Lawers specialists."

The "Visitor's Book" at Ben Lawers Hotel records many of the visits of society members. Several of our number, from time to time, found other accommodation in the area; and on some occasions Killin was the centre.

The 1910 excursion mentioned above is duly recorded in the Visitors' Book. The signatures are:—

"John R. Lee, Isobel J. Hunter, Janet McLellan, George Herriot, Nina Herriot, Geo. Lunam (*Secy.*), J. R. Jack, William Pettigrew, Robert McLean, Wm. Brown, J. G. Robertson, Thos. McGrouther, David Vass."  
(Vass was the angler.)

Underneath the signatures is this effusion.

"By the side of a river a botanist sits  
Near a Willow, a Willow, a Willow.  
He puzzles his brain till he nearly has fits  
O'er that Willow, that Willow, that Willow.  
He glares o'er his Flora with wild rolling eyes  
And thinks that at last he has captured a prize.  
Alas! it is but a *CAPREA* disguise  
That Willow, that Willow, that Willow."

From 1910, annual visits to Lawers and its Hotel continued until 1923. The numbers present varied. 1921 was a memor-

able year. *Saxifraga cernua* was in glorious flower and abundant. Here are some stanzas from the "Visitors' Book":

"We came to view the wealth of Lawers  
Some Glasgow botanists.

\* \* \*

There's Lee, McLean and Airdrie Jack  
And Jack from U.S.A.,  
Once more across the pond come back  
To climb Lawers would essay.

Stewart and Patton likewise keen  
Such company not eschewing  
Joined issue with the lave one e'en  
And so did Mrs. Ewing.

The Ben they climbed, the corries scanned,  
The chimneys and the gullies,  
Collecting rarities was banned,  
That but a good name sullies.

The Bens around were scrambled o'er,  
The cliffs of Creag-an-Lochan,  
Heasgarnich worked to Lyon's shore,  
Biglumis to the Docken.

What wealth of plants! rare *cernua*  
*C. ustulata*, *Gentian*,  
And where they grow—well, there you a'  
The spots we may not mention.

\* \* \*

In addition to those of our members mentioned above, the names of R. M. Fortune (Bowling), J. Wylie Nicol, appear frequently in the "Visitors' Book."

After 1923, the visits from the Society became fewer; viz., 1925, 1926, 1928, 1930, 1936, 1941, 1945; but annually from 1948 till 1954 one or more members stayed at Lawers and botanised the Ben.

In 1952 there was a great revival of the Ben Lawers excursions—a fitting event following upon our Centenary, when 20 members of this Society went by bus to botanise the Ben. They were met at Carie Burn by another party (10) of our members who were week-ending at Killin. And what a glorious excursion (and day) it was. (See *Glasg. Nat.* XVII, part 2.)



## OBSERVATIONS ON EXOTIC FISHES

By WM. JOHN CANNON, F.G.S.

*(Condensed from a lecture given 14th December, 1954)*


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In recent years there has been a great revival of interest in the keeping of aquaria, and particularly in the breeding of small tropical and subtropical fish. Journals dealing with this subject are published monthly, including "*The Aquarist*" and "*Pond Life*" in this country, and "*The Aquarium*" in U.S.A., and there are several standard books (e.g. Innes, W. T., 1938. "*Exotic Aquarium Fishes*," 3rd Ed., Philadelphia). After over four years' experience, notes on several species are given below, including certain observations which differ from those in the text-books. In this, as in all branches of Natural History, it is more important to make original observations than to accept the statements of text-books as being final. It is equally important that the novice aquarist starts with the more easily bred species of fish. Numbers of people, in the first flush of enthusiasm, rush out and purchase highly-priced specimens which may be difficult to keep. Again, they may select fishes from widely separated regions, or from absolutely different climatic conditions. They may place them all together in a tank freshly set up, the water probably straight from the tap and at a temperature unsuited to the specimens. Again, they may purchase and put together only two types and, although the conditions are ideal and the two species of fish from a similar environment, they discover next morning that only one species remains because they selected types, one of which was the natural prey of the other. This frequently leads to their giving up the hobby in disgust. Had they taken advice from an aquarist in the first place they would not have suffered disappointment and their first purchase would have been perhaps two pairs of Guppies, the cheapest and, in many respects, the most interesting of all the exotic freshwater fishes. The dealers profess to despise Guppies, mainly, I think, because they are so cheap that no real profit can be made from them. Yet these little fish have been of use to mankind (in preventive medicine), and in this country there are many experienced aquarists who keep and breed nothing but Guppies.



Guppys (*Lebistes reticulatus*) are natives of Trinidad, Guiana and Venezuela. The males are only one inch in length, while the females measure two inches. Males are magnificently coloured and ornamented and each is as individual as a finger-print. No matter how closely studied, no matter how intensely interbred, no two are exactly alike. They belong to the family Poeciliidae, the live-bearing tooth-carps. This family, though originally native only in tropical America, can now be caught in many other places, having been imported in attempts to control mosquitoes. I have noted certain females to spawn punctually every twenty-one days; the behaviour of the spawning female and of the young immediately after birth was found to differ in some respects from standard descriptions.

The Swordtail (*Xiphophorus hellerii*) is a striking fish of variable colour, originally from Eastern Mexico. Only the male carried the "sword" which is the lower rays of the tail fin elongated, and in every case it is of a contrasting colour. I observed regular spawnings at intervals of six weeks—the mode of birth being similar to that in Guppys.

Mollieniasias, from the West Indies, are related to the above species, and there are many colour varieties. I found the mode of birth again similar, spawning occurring every five weeks. In some individuals, the development of the black colouration of the adult fish took more than six months.

The Zebra (*Brachydanio rerio*) is less than two inches long, a native of Bengal, and also a member of the carp family. It possesses features which make it an ideal occupant of an aquarium. Zebras are unusually active, and moving in schools they show to advantage, their beautiful horizontal stripes being repeated in each individual fish. Although most females bred by me conform to the known pattern in their egg-laying, one female spawned several times in a fashion peculiar to herself, making holes in the sand with her head while her male partner was "chasing" before spawning.

*Barbus nigrofasciatus* is a native of Ceylon, generally called the Nigger Barb. There are variations in the colouring; but the male specimens which I have encountered have black fins, and when in breeding condition a deep port-wine red on the forward part of the body seems to force itself through a film of sooty black. Even in repose the colours are attractive, with

black vertical stripes against a pale yellow ground colour. I have bred the species successfully on several occasions.

The Rosy Barb (*Barbus conchoni*), three and a half inches long, is a native of India. The male is a beautiful coppery red, every scale shining individually, and when seen in subdued lighting looks like a liner passing at night. In my first attempt at breeding a pair of these barbs, the tank became over-packed with fry (186 were counted), but only 24 could be saved.

Another carp (*Tanichthys albonubis*), the White Cloud Mountain Minnow, is just over one inch long, and can be kept in a warm room without a tank heater as it can stand a temperature range of 50° (from 40 - 90°F.). The text-books say with regard to breeding, "the male chases the female who scatters her eggs freely," but my observations are very different. When a pair are put together the male at first does chase the female to some extent, but more often makes violent rushes at her. This phase does not last long. After a time, the male appears to be enticing the female in amongst water-plants, while the female seems to behave coquettishly, approaching and then suddenly swimming away. This stage may last about four hours, by the end of which the male seems to have lost interest. Then the female in turn seems to coax the male towards the plants, darts into the thickest part, then out again, and then repeats the behaviour. On the last occasion the female remains in the thicket and while she remains motionless he twists his body round hers—across her back—until he assumes a horseshoe shape. From this thicket they make for the next, then about seven more visits are paid in rapid succession, and that is their spawning over for two or three days.

The Siamese Fighting Fish (*Betta splendens*) is two and a half inches long and a member of the Anabantidae, which includes the Climbing Perches and the Gourmis. There are now so many shades of colour in the species—blues, violets, greens, and reds—that they could be matched to the wall-papers of rooms. Unfortunately they are savage killers and are short-lived. They are bubble-nest builders.

The Angel Fish (*Pterophyllum eimekei*) are natives of the Amazon and Guiana, and in two years, properly fed, can attain the size of a tea plate. Three or four young fish in a tank are very pleasing—they are so sedate and swim along in formation like yachts. I have never bred or reared Angels myself although I have spawned them in a community tank, and I have observed them in the homes of other aquarists. Their display

in courtship is most interesting, and when ready to spawn they spend about two days washing and cleaning the leaf, stone or other surface on which spawning will take place. Immediately the eggs are laid the parents take it in turn to swim alongside fanning the eggs to keep silt from settling on them. After hatching, a new hole is made in the sand each night as a bed for the young fish, and each of them is washed in a parent's mouth before being put in it. Mr. Cameron, a fellow aquarist, once fed some chopped worm when the parents were putting the young fish to bed. While the adult male had a youngster in his mouth, a piece of worm floated down in front of him, and he darted at it, caught it in his mouth and then stopped dead. The parent fish then swam down to the bottom of the tank where he spat out both the young fish and the worm. Taking up the youngster again, he spat it into the sand-nest, then returned and ate the worm. On another occasion, Mr. Cameron observed a youngster which would not remain in the sand-nest. The male parent made several attempts to place this one with the others—until eventually the female seized it in her mouth, appeared to chew it over several times, and then returned it alive to the nest with the rest of the offspring, where it then remained.



## CLIMATOLOGICAL AND SALINITY DATA FOR MILLPORT, SCOTLAND

By H. BARNES, The Marine Station, Millport

(Received June, 1955)

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### Introduction.

Climatological observations have been made regularly at the Scottish Marine Biological Association's laboratory at Millport, Firth of Clyde, since August 1948, and whilst a period of five years is small by conventional meteorological standards there are good reasons for publishing a summary of the results for the five year period 1949-1953. In the first place there is only a limited amount of data for similar sites and no continuous records of salinity and sea temperatures for the region—a regrettable lack when contrasted with the wealth of data for the adjacent Irish Sea; secondly, the data gives some basic factual information to which reference may be made in future hydrographic work, a new programme of which is now in progress at Millport. Further, from the biologist's point of view it is hoped that they will be found useful as representing some of the physical conditions of an area in which many biological studies of both the littoral and sub-littoral zones are being made. The recent increased interest in problems of a zoo-geographical nature has lead to a demand for such physical data—particularly from locations such as marine stations where the biology of the animals is already known or being studied, and to judge from the number of requests received for such data the summary given below should be of use to workers in this field.

### The Situation, Methods of Observation and Computations.

The Marine Station is situated near Keppel Pier, Millport, Great Cumbrae, Buteshire, Scotland ( $55^{\circ} 44' 55''$  N. ;  $4^{\circ} 54' 20''$  W.). It is on the south side of the island, facing directly down the Firth of Clyde.

All readings and observations are taken once daily at 09.00 hours G.M.T., and full monthly returns are sent to the Meteorological Office whose representatives visit the installation annually and check the instruments.

The sea temperatures have been taken from the pier at Keppel daily at 09.00 hours G.M.T. irrespective of the state



of the tide, using either a specially constructed sampler or the bucket method, in the latter case taking the precautions recommended by Brookes (1928) ; the two methods have been checked against one another and found consistent. The temperatures are read to the nearest  $0.1^{\circ}\text{C}.$  with a thermometer ( $0^{\circ}$ – $30^{\circ}\text{C}.$ ) graduated to  $0.1^{\circ}\text{C}.$ , and are recorded as representing the day on the morning of which they are taken. Day to day variations are often quite considerable, particularly during the summer months when at certain states of the tide the surface water may, at the time of sampling, have been heated in the adjacent shallow sandy bays. From the daily observations the mean monthly values have been calculated for each month of the five years as well as the monthly grand mean.

Air temperatures, wet and dry bulb readings are taken with certificated Meteorological Office instruments maintained in a standard Stevenson screen. Relative humidity is calculated from Meteorological Office Tables. Unfortunately, maximum and minimum thermometers have not been available over the whole period and the daily mean temperature cannot therefore be given. However, a comparison of the 09.00 hour values with the data from other nearby stations recorded in the Meteorological Office returns suggest that variations of air temperatures within the area are small, and the monthly means are therefore given for the maximum, minimum and mean daily temperatures at the Rothesay station ( $55^{\circ} 50' \text{ N. ; } 5^{\circ} 2' \text{ W. ; } 200 \text{ ft.}$ ) for the 1921-1950 period (1953).

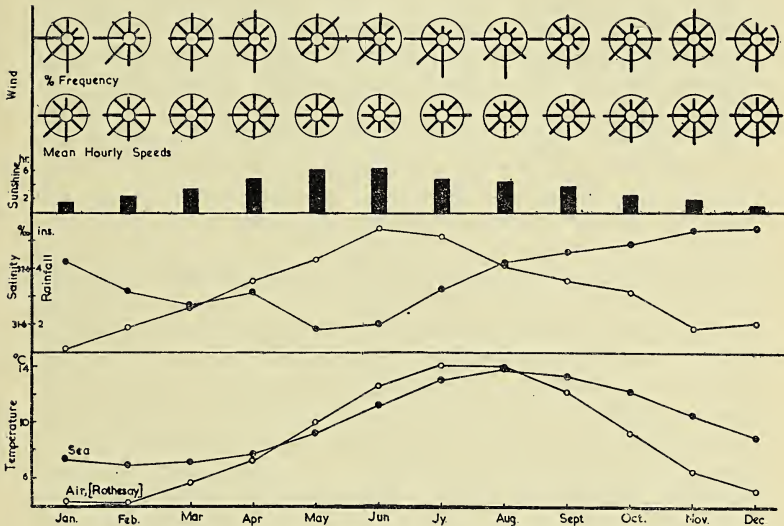
No sunshine records are available. A comparison of a number of records for the nearest coastal stations again suggests that there is no great variation over the coastal area of the outer Firth and the values at the Rothesay station (Stokes-Campbell recorder) for the period 1921-1950 are therefore given (1953).

The wind records are obtained on a standard Dines continuous recording anemometer (height above the ground 30 ft.) The mean hourly wind speed (knots) and direction for each hour of the day are estimated. From these hourly wind speeds and directions there have been computed for the five year period, (i) the percentage frequency and arithmetic mean speed of winds from eight sectors ; (ii) the percentage frequency distribution of the hourly wind speeds for each month and year irrespective of direction and (iii) the resultant vector mean speed for each month calculated from percentage frequency and mean speed (without any correction for grouping).

The salinities have been determined by the usual titration method using as standard *Eau de mer normale* and calculating the values from Knudsen's Tables (1901).

## Temperature.

The temperature trends (Table 1) are typical of the north temperate zone. The mean monthly sea temperature reaches a minimum of  $6.96^{\circ}\text{C}$ . in February from which a slow rise takes place during March and April. From then onwards to July the rate of increase of temperature is almost uniform and amounts to  $1.75^{\circ}\text{C}$  per month. The maximum mean temperature is reached in August at  $13.72^{\circ}\text{C}$ , so that there is an annual mean range of  $6.76^{\circ}\text{C}$ . In 1949, however, the maximum mean



**Figure 1.**—Summary of records for years 1949-1953. (See text and table 1). In wind roses distance between the two circles is equal to 10% frequency or a velocity of 10 knots.

monthly temperature was not reached until September. From August the mean monthly temperature gradually falls; between September and January this rate of change is almost uniform at  $1.47^{\circ}\text{C}$  per month, that is, rather slower than the rate of increase during the summer. The variation in mean monthly temperatures from year to year is small, rarely deviating from the 5-year mean by more than  $1^{\circ}\text{C}$  and more generally by only  $0.5^{\circ}\text{C}$ .

The mean monthly air temperature (Rothsay) also reaches its minimum in February ( $4.3^{\circ}\text{C}$ ) and rises steadily to reach its maximum of  $14.1^{\circ}\text{C}$  in July, a month before that of the sea, the rate of increase being greater than that of the latter. Likewise the fall from this maximum is at a

greater rate than for the sea temperature. The range of temperature, that is the difference between the mean maximum and minimum monthly temperatures is smallest in winter ( $4.33 - 4.71^{\circ}\text{C}$ ) and highest in June ( $7.68^{\circ}\text{C}$ )—the month which precedes the maximum temperature.

### Rainfall.

The rainfall (see Table 1) is not excessive for a west of Scotland site; it amounts to some 45 inches per year for the 5 or 36-year average, which is 5 inches less than the general average rainfall for Scotland and only 4 inches more than that for the British Isles (see *The Book of Normals*, M.O. 236). The annual variation is not great—a maximum of 50.12 inches in 1949 and a minimum of 42.07 inches in 1953 for the five years under survey—which is in accord with the fact pointed out by Glasspoole (1921) that the smallest mean deviations from the average rainfall in the British Isles are to be found over Northern Ireland and the Western Seaboard of Scotland. In the early part of the year the rainfall drops from 4.29 inches in January to the minimum of 1.82 inches in May. This fall is not, however, regular—there is a rise to 3.16 inches in April compared with 2.72 inches in March and the annual minimum of 1.82 inches quoted for May. The June rainfall is still low (2.05 inches) but thereafter throughout the summer and autumn months there is a rise, quite steeply to the annual maximum of 5.42 inches in December, although the rate of increase falls off during the autumn months. There is no September subsidiary minimum value of the rainfall. When the long period results are considered, April is seen to be the driest month (2.62 inches) with a rise to a maximum in October. Even in the long term averages there is no September subsidiary minimum, but there is such a subsidiary minimum in November as well as a subsidiary maximum in May.

### Surface Salinity.

The grand mean for the surface salinity is  $32.10\text{‰}$  with a winter minimum of  $31.26\text{‰}$  in January and a maximum of  $32.98\text{‰}$  in June. Between these two months the salinity gradually rises. The effect of the rainfall on surface salinity is maximal during the summer months since there is then a well developed thermocline and consequently considerable vertical stability of the water column. The relation between rainfall and surface salinities is shown in Figure 2 in which the excess of the mean monthly rainfall over the general mean for each month of the five years is plotted against the



equivalent value for salinity. The values of the two regression lines are :—

$$S_{\text{‰}} = -0.22 R$$

$$R = -1.078 S_{\text{‰}}$$

and the correlation coefficient of  $-0.489$  ( $n=58$ ) is highly significant. (for  $n=60$ ,  $r=0.250$ ,  $P=5\%$  and  $r=0.325$ ,  $P=1\%$ ).

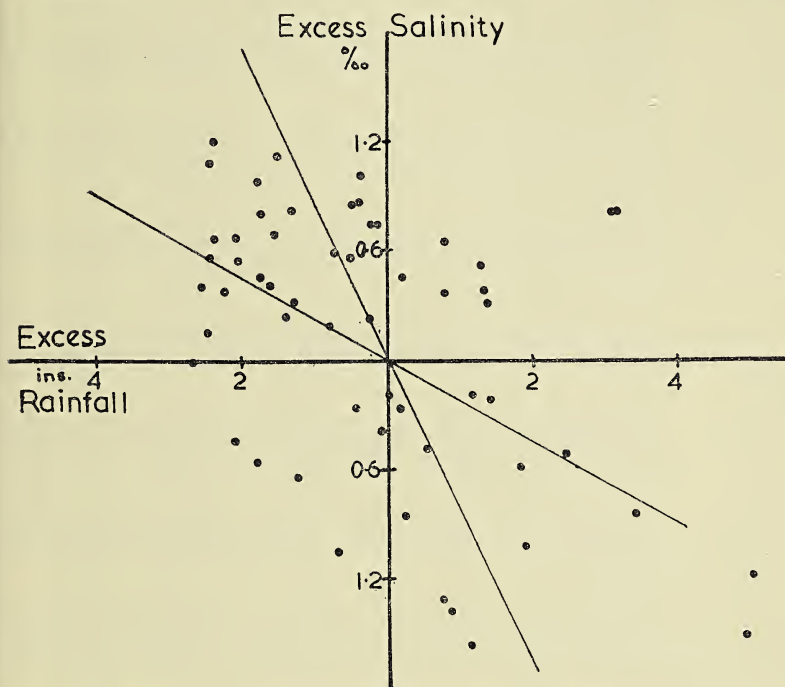


Figure 2.—Plot of excess salinity against excess rainfall.

The daily anomalies of salinity (see Proudman, 1943) and their standard deviations have been calculated according to the month for the five year period. These daily anomalies are obtained by subtracting the appropriate monthly mean value from the individual daily values. The values obtained (Table 2) show a distinct seasonal variation—high values in the winter months and a minimum value in June. Proudman (1943) in examining his Irish Sea stations found that only those nearer the shore (Liverpool Bar and Morecambe Bay) gave such a seasonal variation. The seasonal variation found in the present results is similar in character to that at Morecambe Bay, and may be ascribed to the greater influence of



**TABLE 1.**—Millport; monthly mean values of sea temperature (S.T.) in °C, surface salinity (S‰) in °C, air temperature (A.T.) in °C and rainfall in inches. The mean value of rainfall over an extended period is also given. Monthly means rounded to nearest 0.1°C. Grand means calculated from individual values. The monthly means of maximum (R. max. T.), minimum (R. min. T.), minimum (R. min. T.) and mean (R. mean T.) air temperatures and the total (R. sun T.) and daily (R. sun D.) hours of sunshine for Rothesay (55° 50' N; 5° 2' W; 200 ft.) for the period 1921-1950.

| Year       | Quantity | Jan.  | Feb.  | March | April | May   | June  | July  | Aug.  | Sept. | Oct.  | Nov.  | Dec.  | Mean/<br>Total |
|------------|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|
| 1949       | S.T.     | 7.9   | 7.4   | 7.2   | 8.2   | 9.8   | 11.7  | 12.7  | 13.1  | 14.3  | 13.2  | 11.0  | 9.2   | 10.48          |
| 1949       | S‰       | 30.73 | 30.54 | 31.05 | 31.52 | 31.54 | 32.76 | 33.17 | 32.75 | 32.79 | 32.91 | 31.59 | 31.26 | 31.88          |
| 1949       | A.T.     | —     | —     | 6.3   | 8.7   | 11.1  | 14.6  | 15.5  | 15.1  | 14.8  | 11.7  | 8.3   | 6.3   | —              |
| 1949       | Rain     | 4.69  | 4.93  | 3.11  | 5.61  | 1.97  | 1.39  | 1.30  | 4.56  | 2.23  | 6.92  | 6.24  | 7.17  | 50.12          |
| 1950       | S.T.     | 8.1   | 7.1   | 7.6   | 8.2   | 9.2   | 12.0  | 14.0  | 14.7  | 13.4  | 11.7  | 10.3  | 8.1   | 10.37          |
| 1950       | S‰       | 29.91 | 31.25 | 31.46 | 31.84 | 32.57 | 32.90 | 32.41 | 31.62 | 30.60 | 30.34 | 31.84 | 32.48 | 31.61          |
| 1950       | A.T.     | 5.8   | 4.8   | 7.6   | 7.6   | 11.4  | 14.1  | 15.1  | 14.7  | 12.1  | 10.2  | 6.7   | 3.4   | 9.45           |
| 1950       | Rain     | 3.13  | 4.02  | 2.55  | 3.33  | 1.31  | 2.02  | 5.17  | 4.32  | 8.72  | 4.05  | 3.95  | 1.54  | 44.11          |
| 1951       | S.T.     | 6.3   | 6.2   | 6.6   | 7.1   | 8.4   | 10.5  | 12.5  | 13.1  | 12.9  | 12.0  | 10.7  | 8.9   | 9.59           |
| 1951       | S‰       | 31.90 | 31.70 | 32.28 | 32.34 | 32.77 | 33.08 | 32.95 | 32.84 | 32.33 | 32.25 | 32.09 | 30.93 | 32.29          |
| 1951       | A.T.     | 4.9   | 4.0   | 4.8   | 6.9   | 10.2  | 13.2  | 14.7  | 13.8  | 13.3  | 11.1  | 9.2   | 6.9   | 9.44           |
| 1951       | Rain     | 4.95  | 3.67  | 2.97  | 2.37  | 1.69  | 1.98  | 3.26  | 3.63  | 3.51  | 1.31  | 6.43  | 8.79  | 44.56          |
| 1952       | S.T.     | 7.4   | 7.1   | 7.3   | 8.1   | 9.3   | 10.6  | 12.9  | 13.5  | 12.4  | 11.2  | 10.0  | 8.4   | 9.85           |
| 1952       | S‰       | 31.09 | 31.66 | 31.91 | 32.55 | 32.51 | 32.84 | 32.67 | 32.46 | 32.96 | 32.91 | 32.42 | 32.62 | 32.38          |
| 1952       | A.T.     | 3.3   | 5.1   | 6.6   | 9.4   | 11.7  | 12.4  | 14.8  | 14.6  | 11.6  | 9.5   | 5.6   | 5.2   | 9.14           |
| 1952       | Rain     | 5.66  | 1.68  | 3.77  | 2.03  | 1.90  | 3.51  | 3.25  | 4.56  | 3.39  | 6.81  | 2.50  | 5.05  | 44.11          |
| 1953       | S.T.     | 7.4   | 7.0   | 7.3   | 7.4   | 9.4   | 11.3  | 13.1  | 14.3  | 13.5  | 12.6  | 10.6  | 9.9   | 10.31          |
| 1953       | S‰       | 32.69 | 32.65 | 32.51 | 32.92 | 33.22 | 33.30 | 33.11 | 32.55 | 32.48 | 31.88 | 29.83 | 30.79 | 32.33          |
| 1953       | A.T.     | 5.7   | 5.3   | 6.5   | 7.1   | 14.6  | 14.6  | 14.4  | 14.9  | 13.7  | 11.5  | 9.4   | 7.7   | 10.19          |
| 1953       | Rain     | 3.04  | 1.70  | 1.20  | 2.47  | 2.25  | 1.36  | 3.39  | 3.99  | 5.12  | 5.18  | 7.83  | 4.54  | 42.07          |
| 1949-53    | S.T.     | 7.42  | 6.96  | 7.19  | 7.79  | 9.23  | 11.22 | 13.04 | 13.72 | 13.29 | 12.15 | 10.53 | 8.90  | 10.12          |
| 1949-53    | S‰       | 31.26 | 31.56 | 31.84 | 32.23 | 32.54 | 32.98 | 32.86 | 32.44 | 32.23 | 32.06 | 31.55 | 31.62 | 32.10          |
| 1949-53    | A.T.     | 4.92  | 4.81  | 6.33  | 7.94  | 11.19 | 13.79 | 14.90 | 14.60 | 13.09 | 10.79 | 7.83  | 5.90  | 9.67           |
| 1949-53    | Rain     | 4.29  | 3.20  | 2.72  | 3.16  | 1.82  | 2.05  | 3.27  | 4.21  | 4.59  | 4.85  | 5.39  | 5.42  | 44.99          |
| 1916-51    | Rain     | 4.99  | 3.25  | 2.73  | 2.62  | 2.83  | 2.72  | 3.42  | 3.73  | 4.06  | 5.05  | 4.70  | 4.95  | 45.05          |
| 1921-50 R. | Max. T.  | 6.61  | 6.66  | 8.44  | 10.62 | 13.83 | 16.46 | 17.57 | 17.23 | 15.22 | 11.84 | 8.83  | 7.28  | 11.73          |
| 1921-50 R. | Min. T.  | 2.17  | 1.95  | 2.72  | 3.89  | 6.17  | 8.78  | 10.50 | 10.67 | 9.05  | 6.72  | 4.23  | 2.95  | 5.83           |
| 1921-50 R. | Mean T.  | 4.39  | 4.28  | 5.61  | 7.28  | 10.00 | 12.61 | 14.06 | 13.95 | 12.17 | 9.27  | 6.50  | 5.11  | 8.78           |
| 1921-50 R. | Sum. T.  | 35    | 57    | 100   | 143   | 186   | 187   | 149   | 140   | 112   | 75    | 50    | 30    | 1,264          |
| 1921-50 R. | Sum. D.  | 1.14  | 2.03  | 3.23  | 4.75  | 6.01  | 6.24  | 4.80  | 4.50  | 3.74  | 2.42  | 1.66  | 0.97  | 3.46           |

## SALINITY

SEASONAL VARIATION OF DAILY ANOMALIES (STANDARD DEVIATION)

| <i>January</i> | <i>February</i> | <i>March</i> | <i>April</i> | <i>May</i> | <i>June</i> | <i>July</i> | <i>August</i> | <i>September</i> | <i>October</i> | <i>November</i> | <i>December</i> |
|----------------|-----------------|--------------|--------------|------------|-------------|-------------|---------------|------------------|----------------|-----------------|-----------------|
| 1.424          | 1.147           | 0.827        | 0.671        | 0.707      | 0.230       | 0.495       | 0.748         | 1.148            | 1.351          | 1.196           | 1.254           |

TABLE 3

TIDAL VARIATION OF DAILY ANOMALIES IN SALINITY (‰)

HOURS AFTER HIGH WATER, GREENOCK

| 0      | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | 11     |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| + .121 | + .110 | + .011 | + .050 | — .101 | + .020 | — .078 | — .038 | — .044 | — .024 | — .020 | — .007 |

water from the land during the winter months, while the more estuarine conditions are responsible for the larger deviations in the present series.

An attempt was made to demonstrate the tidal variations in the salinity and since salinities were taken at a fixed hour daily, the method of Proudman (1943) was followed. The daily anomalies were first grouped into twelve groups at hourly intervals from the time of high water at Greenock. The mean of each group was calculated and from each group mean the over all mean of the twelve groups was subtracted. The results are shown in Table 3. A distinct oscillation in the values is found and can be regarded as the tidal effect on the daily anomalies ; as with the results of Proudman for Morecambe Bay and Liverpool Bar the maxima in the daily anomalies occur at about the time of high water. However, the results are less regular than might be expected from the influence of a regular semi-diurnal tide. This is no doubt due to irregularities in the tidal currents for although no detailed information is yet available general observations (see for example Quayle 1952) indicate that whilst ebb currents are regular those of the flood are very irregular—a reverse eddy probably being present during that period.

#### Wind Speed and Direction (Tables 4 and 5).

There is very little change in the mean hourly wind speed throughout the year, the maximum in October (13.22 knots) being only 5 knots greater than the June minimum. With the exception of March and May the most frequent winds are always from the south-west quadrant but in these two months there is a high proportion from the north-east. Not only do the winds blow most frequently from the south-west quadrant but they attain their greatest velocities from that direction, the late autumn and winter mean values ranging from about 16-17 knots. The diminution in the mean speed during the summer is largely due to the reduction in intensity from that direction. With the exception of March and May there is always a residual wind of up to 5 knots from the south-west quadrant, and usually very near to south-west itself. In March there is a residual—although it is only slight—from the south-east quadrant and in May a small residual of 1.9 knots from the north-east. The percentage frequency of the hourly wind speeds is shown in Table 5.

The winter and spring months are very similar with the 11-21 and 4-10 knot groups about equal frequency. During the summer with the lighter winds there is a distinct frequency maximum of the 4-10 group accompanied by a general shift of frequencies towards the lower speed groups.



over five years (1949-1953) from eight sectors, and arithmetic mean speed in each sector. Resultant vector means calculated.

| Month | Direction                 | N.           | N.E.         | E.           | S.E.         | S.           | S.W.         | W.           | N.W.         | Mean<br>hourly<br>wind | Residual<br>wind |
|-------|---------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------------------|------------------|
| Jan.  | % Frequency<br>Mean Speed | 8.10<br>...  | 4.66<br>...  | 7.98<br>...  | 11.08<br>... | 19.33<br>... | 19.68<br>... | 18.33<br>... | 10.84<br>... | 12.87                  | 220°             |
|       |                           | 7.01         | 10.37        | 11.94        | 10.21        | 14.12        | 17.17        | 14.66        | 8.63         | ...                    | 5.7              |
| Feb.  | % Frequency<br>Mean Speed | 14.08<br>... | 3.54<br>...  | 6.27<br>...  | 7.61<br>...  | 14.70<br>... | 20.12<br>... | 21.60<br>... | 12.08<br>... | 12.22                  | 240°             |
|       |                           | 7.84         | 11.35        | 13.81        | 9.86         | 13.11        | 15.53        | 13.07        | 10.14        | ...                    | 4.9              |
| Mar.  | % Frequency<br>Mean Speed | 13.12<br>... | 15.26<br>... | 10.16<br>... | 12.00<br>... | 18.51<br>... | 9.67<br>...  | 11.15<br>... | 10.22<br>... | 10.96                  | 151°             |
|       |                           | 9.12         | 11.41        | 11.04        | 10.77        | 11.96        | 13.24        | 10.64        | 9.14         | ...                    | 1.1              |
| April | % Frequency<br>Mean Speed | 15.54<br>... | 8.35<br>...  | 4.95<br>...  | 6.83<br>...  | 19.89<br>... | 12.14<br>... | 20.88<br>... | 11.42<br>... | 11.86                  | 245°             |
|       |                           | 9.34         | 12.88        | 12.64        | 11.21        | 12.63        | 13.11        | 13.62        | 8.70         | ...                    | 3.0              |
| May   | % Frequency<br>Mean Speed | 13.11<br>... | 17.66<br>... | 16.90<br>... | 6.05<br>...  | 11.05<br>... | 11.30<br>... | 15.13<br>... | 8.80<br>...  | 10.32                  | 49°              |
|       |                           | 9.59         | 12.87        | 13.62        | 6.08         | 9.44         | 8.58         | 9.25         | 8.02         | ...                    | 2.1              |
| June  | % Frequency<br>Mean Speed | 13.56<br>... | 7.04<br>...  | 5.07<br>...  | 10.59<br>... | 13.63<br>... | 18.83<br>... | 19.18<br>... | 12.11<br>... | 8.22                   | 250°             |
|       |                           | 10.41        | 7.69         | 9.46         | 9.86         | 7.66         | 7.81         | 7.95         | 5.81         | ...                    | 1.6              |
| July  | % Frequency<br>Mean Speed | 3.40<br>...  | 3.81<br>...  | 9.11<br>...  | 9.52<br>...  | 22.73<br>... | 20.79<br>... | 22.51<br>... | 8.14<br>...  | 9.14                   | 202°             |
|       |                           | 5.82         | 10.34        | 15.24        | 8.29         | 9.52         | 9.09         | 8.26         | 5.57         | ...                    | 3.5              |
| Aug.  | % Frequency<br>Mean Speed | 7.18<br>...  | 5.73<br>...  | 7.18<br>...  | 14.78<br>... | 23.33<br>... | 16.66<br>... | 19.57<br>... | 5.56<br>...  | 9.64                   | 195°             |
|       |                           | 5.24         | 9.31         | 10.66        | 10.29        | 11.00        | 10.64        | 8.98         | 6.31         | ...                    | 4.0              |
| Sept. | % Frequency<br>Mean Speed | 12.65<br>... | 7.49<br>...  | 9.75<br>...  | 5.47<br>...  | 16.53<br>... | 16.42<br>... | 23.04<br>... | 8.64<br>...  | 11.28                  | 229°             |
|       |                           | 6.37         | 11.40        | 13.46        | 10.43        | 12.26        | 13.72        | 12.29        | 6.87         | ...                    | 3.4              |
| Oct.  | % Frequency<br>Mean Speed | 6.19<br>...  | 3.51<br>...  | 16.12<br>... | 15.04<br>... | 18.56<br>... | 16.72<br>... | 15.64<br>... | 8.22<br>...  | 13.22                  | 189°             |
|       |                           | 6.19         | 12.60        | 14.04        | 11.95        | 14.78        | 16.62        | 14.34        | 6.93         | ...                    | 5.0              |
| Nov.  | % Frequency<br>Mean Speed | 16.09<br>... | 11.38<br>... | 8.06<br>...  | 11.89<br>... | 15.27<br>... | 15.75<br>... | 12.54<br>... | 9.02<br>...  | 12.42                  | 199°             |
|       |                           | 7.30         | 14.24        | 11.20        | 12.16        | 15.76        | 16.25        | 13.20        | 7.22         | ...                    | 2.6              |
| Dec.  | % Frequency<br>Mean Speed | 14.94<br>... | 5.77<br>...  | 8.04<br>...  | 11.83<br>... | 18.79<br>... | 15.38<br>... | 16.78<br>... | 8.48<br>...  | 13.02                  | 209°             |
|       |                           | 8.56         | 11.67        | 12.64        | 13.80        | 16.27        | 16.21        | 14.43        | 8.22         | ...                    | 4.2              |



T A B L E 5

## FREQUENCY OF THE WIND SPEEDS (KNOTS)

1949 TO 1953

| <i>Speed (knots)</i> |     | $>34$ | 22-33 | 11-21 | 4-10 | 0-3  |
|----------------------|-----|-------|-------|-------|------|------|
| JANUARY              | ... | .2    | 7.7   | 37.6  | 34.2 | 20.4 |
| FEBRUARY             | ... | .2    | 9.1   | 38.2  | 37.1 | 15.4 |
| MARCH                | ... | 0     | 5.0   | 39.1  | 39.0 | 17.0 |
| APRIL ...            | ... | .2    | 6.3   | 43.1  | 37.0 | 13.3 |
| MAY ...              | ... | .1    | 5.3   | 33.0  | 41.5 | 20.1 |
| JUNE ...             | ... | 0     | 1.4   | 22.8  | 44.7 | 31.1 |
| JULY ...             | ... | .5    | 2.2   | 28.5  | 45.2 | 23.7 |
| AUGUST               | ... | 0     | 2.0   | 32.6  | 46.2 | 19.2 |
| SEPTEMBER            | ... | .1    | 6.2   | 39.6  | 36.2 | 18.0 |
| OCTOBER              | ... | .4    | 6.3   | 49.7  | 29.5 | 14.2 |
| NOVEMBER             | ... | .4    | 9.2   | 40.1  | 37.3 | 13.0 |
| DECEMBER             | ... | .8    | 9.1   | 45.2  | 34.1 | 10.9 |

T A B L E 6

## THE MEAN RELATIVE HUMIDITY 1950-1953

| <i>January</i> | <i>February</i> | <i>March</i> | <i>April</i> | <i>May</i> | <i>June</i> | <i>July</i> | <i>August</i> | <i>September</i> | <i>October</i> | <i>November</i> | <i>December</i> |
|----------------|-----------------|--------------|--------------|------------|-------------|-------------|---------------|------------------|----------------|-----------------|-----------------|
| 87             | 86              | 82           | 77           | 79         | 79          | 79          | 85            | 83               | 87             | 87              | 85              |

# T A B L E 7

Visibility : average number of days each month (years 1949-1953) visibility was restricted to distances shown ;  
all objects sited to south of station i.e. seawards.

| DISTANCE  |     |     | 150 yards | 440 yards | 1.2 miles | 5.2 miles | 10 miles | 19.2 miles | >35 miles |
|-----------|-----|-----|-----------|-----------|-----------|-----------|----------|------------|-----------|
| JANUARY   | ... | ... | 0         | 0.6       | 2.8       | 11.2      | 3.6      | 6.0        | 6.8       |
| FEBRUARY  | ... | ... | 0         | 0.2       | 2.2       | 8.4       | 2.6      | 7.0        | 7.8       |
| MARCH     | ... | ... | 0         | 0.8       | 3.4       | 12.0      | 2.6      | 5.6        | 6.6       |
| APRIL     | ... | ... | 0         | 0         | 0.8       | 8.6       | 1.8      | 8.6        | 10.2      |
| MAY       | ... | ... | 0         | 0         | 0.8       | 14.8      | 2.8      | 7.8        | 4.8       |
| JUNE      | ... | ... | 0         | 0         | 0.4       | 13.8      | 1.4      | 4.6        | 9.8       |
| JULY      | ... | ... | 0         | 0         | 0.6       | 8.6       | 1.6      | 9.6        | 10.6      |
| AUGUST    | ... | ... | 0         | 0.2       | 1.0       | 8.0       | 3.8      | 10.6       | 7.4       |
| SEPTEMBER | ... | ... | 0.2       | 0.2       | 1.2       | 8.0       | 5.6      | 8.0        | 6.8       |
| OCTOBER   | ... | ... | 0         | 0         | 1.8       | 14.0      | 2.8      | 5.4        | 7.0       |
| NOVEMBER  | ... | ... | 0         | 0         | 0.4       | 8.2       | 5.4      | 6.6        | 9.4       |
| DECEMBER  | ... | ... | 0         | 0.2       | 1.6       | 8.2       | 4.4      | 8.6        | 8.0       |

### Other Climatological Factors.

The mean relative humidity is given in Table 6. There is very little variation throughout the year—although somewhat smaller values are found during the early summer months.

A summary of visibility is given in Table 7. The visibility is extremely good throughout the year, there being only 19.4 days when it is restricted to less than 1.2 miles whilst on 95 days distances of 35 miles or more can be clearly seen in a southerly direction. It should be emphasised that local variations in visibility are considerable; all the visibility marks are towards the south, and whilst distant objects are quite often visible in this direction there may be a thick "fog" in the main channel as a result of the orographical effects of the high ground on Arran to the west of this channel.

### Summary.

1. Some climatological and salinity data are presented for Millport, Firth of Clyde, based on the results of a five year period, 1949-1953.

2. Details are given of the site, methods of observation and computations.

3. Data for air and sea temperatures, rainfall, surface salinity, wind speed and direction, relative humidity, sunshine (Rothesay) and visibility are presented and briefly discussed.

4. The relation between mean surface salinity and rainfall is discussed and it is shown that there is a significant correlation.

5. The daily anomalies of salinity are calculated and shown to have a tidal oscillation and their standard deviations show a seasonal trend.

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## SOME OBSERVATIONS ON BEETLES OF THE FAMILY CLAMBIDAE

By R. A. CROWSON and E. A. CROWSON

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The two British genera—*Clambus* Fisch. and *Calypptomerus* Redt.—commonly grouped in the family CLAMBIDAE include very small (length c. 1 mm.), very rounded and convex beetles with large heads, slender legs and rather short clubbed antennae. They are able to roll the body into an almost spherical shape by reflexing the head and prothorax against the underside of the rest of the body. In both genera the femora of the hind legs are received in the deeply excavate hind coxae, the antennae are 10-segmented with a 2-segmented club, and the tarsi are simple and 4-segmented. In spite of these similarities there are some reasons for supposing that the two genera are not closely allied. Of the four recognised British species of *Clambus*, two occur more or less commonly in the Clyde valley and a third has been met with there; the single British species of *Calypptomerus* has been found by us at Craigielaw, Aberlady and is recorded also from Berwickshire and the Solway area (though we failed to find it near Dumfries and Annan). The largest of our species, *Clambus minutus* Sturm, occurs fairly commonly in the Clyde valley, where it should be sought on more or less water-logged sticks lying partly in or adjacent to streams in shady situations. We have found adults of this species in such situations from early May to September, and on 30th October, 1954 a considerable number were found in Clyde flood drift at Garrion Bridge. Larvae of *Clambus* have not hitherto been described, but in August, 1954 we obtained two from a culture of adult *C. minutus* set up about a month earlier, and similar larvae were found in the field in June, 1952. A culture set up on 12th June, 1955 revealed a small larva of the same species on 22nd June, which had pupated by 1st July—the pupa was fixed and preserved. Both adult and larva of *C. minutus* were observed by us to feed on hyphae and spores of moulds; other possible foods were yeasts and Mycetozoa. The indications are that the females lay few but large eggs (this was confirmed by microscopic preparations of the internal reproductive organs) and that the larvae develop quickly; it is possible that more than



one generation may occur in a year. The pupa was not enclosed in a cell or cocoon, but appeared to be somewhat obtected like those of PTLIIDAE and CORYLOPHIDAE. The adults took to flight readily in captivity, mainly when exposed to direct sunlight, and one was observed in the field flying in bright hot sunshine on 4th May, 1953. It is interesting that no *Clambus* were found among the very numerous Coleoptera caught in evening flight at Wicken Fen. The second common *Clambus* species in our area, *C. pubescens* Redt., usually occurs in rather drier habitats than *C. minutus*—we have as yet no data on its early stages. Adult *C. pubescens* have been met with apparently in hibernation under haystacks. This last mentioned habitat is the normal one for all stages of *Calyptomerus dubius*. We found it easy to feed this species in captivity on moulds growing on bits of stale bread ; a number of adults were collected at Craighielaw on 31st March, 1955, two of them observed *in copula* on 1st April were placed in a special culture on that day, and a series of eggs were found from 3rd April onwards at a rate of about two per day for a fortnight. The first egg was seen to hatch on 20th April, three of the surviving larvae had pupated by 1st June (a number having been fixed for scientific study before this) and another pupated on 3rd June. An adult emerged on 11th June from one of the pupae found on 1st June. The evidence then is that *Calyptomerus* females lay many more eggs than do *Clambus*, and that the larval development in the former genus is much longer. We attempted without success to breed from a number of adult *Calyptomerus* brought in in July, 1954, which suggests that this species may have only one generation in a year. Adults of it are readily found in the normal habitats throughout the winter months, and we found it possible to keep them alive for months in captivity. We have never observed this species to fly, though it has very well developed wings, which, incidentally, differ strikingly in venation and folding from those of *Clambus*.

NEW AND NEWLY-CONFIRMED DISTRIBUTION  
RECORDS OF NON-MARINE MOLLUSCS IN  
THE WEST OF SCOTLAND (IIIrd PAPER)

By W. RUSSELL HUNTER

(Revised to July, 1955)

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New distribution records up to May, 1953 are reported in earlier notes in this journal (Hunter, 1952, 1953c; see also Ellis, 1952, 1954). The records commented on in the present paper occurred mainly in collections made and determined by the author in the years 1953-55. As in the earlier notes, the nomenclature and systematics follow those of Ellis (1951), and eight further new vice-comital records are given here (marked thus \* below), as well as confirmed occurrences of certain other species for which verified records are scanty. For convenience, the records are grouped under three regional headings: (1) Loch Lomond District; (2) Glasgow District, and (3) Island of Lismore. Other new records from the Island of Skye are being reported elsewhere. The author must thank Mr. A. E. Ellis, the Recorder of the Conchological Society, for his identification of the *Anodonta* mentioned below, and for his verifying the author's identifications of all other species constituting vice-comital records; and acknowledge gratefully the continued interest and help of Professor C. M. Yonge, C.B.E., F.R.S., of Dr. H. D. Slack, F.R.S.E., and of his wife.

(1) **Loch Lomond District.**

*Acroloxus lacustris* (L.), Lake Limpet.

Specimens of this snail have now been found in Loch Lomond, at a depth of about 1 m., approximately 400 yds. north of the outfall of the Endrick Water. *Elodea canadensis* and an unidentified *Potamogeton* sp. occurred in the same dredging: *Acroloxus* had probably been living on the latter plant. Although this is almost certainly the first recorded occurrence of the limpet in Loch Lomond (see Hunter, 1953b and c), it does not constitute a new vice-comital record, as this part of the shore of the loch lies in vice-county 86 (Stirling), for which *A. lacustris* is already recorded.

\**Lauria (Leiostyla) anglica* (Wood), English Chrysalis Snail.

Specimens of this snail have been collected at several localities in vice-county 99 (Dunbarton), establishing a new vice-comital record. Near Rossdhu, Loch Lomond, the species is one of several land snails which move down on to the beaches of the loch at times of low water. Others include *Carychium* spp., *Cochlicopa lubrica* (Müller), *Euconulus fulvus* (Müller), *Retinella radiatula* (Alder), and *Zonitoides nitidus* (Müller). These species generally live and feed among the plant debris lying on the gravel, living in much drier conditions than does *Succinea (Oxyloma) pfeifferi* Rossmässler (see Hunter, 1953*d*, in this journal). In addition, thick crops of seedling sycamores growing on the gravel beach have been eaten almost completely by them. *L. anglica* also occurs in several moorland walls in Dunbartonshire, and Mr. David A. Muir and the present author have made several collections of it and its more abundant congener *L. cylindracea* (da Costa) along such "dry-stane dykes" (notably on Goukhill Muir and Highfields Muir). A note on these collections may be published at a later date, but at present it appears that, on the same wall, *L. cylindracea* occurs in the drier ecotopes (*e.g.* in places where ant colonies occur) and *L. anglica* in ecotopes damp enough to support such slugs as *Agriolimax laevis* (Müller).

\**Anodonta anatina* (L.).

A recently-dead specimen of this freshwater mussel was collected by Dr. H. D. Slack in the Endrick Water below Drymen Bridge. The specimen was identified by Mr. A. E. Ellis as *A. anatina* and, as the river here forms the county boundary, this establishes a new record for both vice-counties 86 (Stirling) and 99 (Dunbarton).

\**Pisidium henslowanum* (Sheppard).

This bivalve has been collected in several localities in the southern part of Loch Lomond in depths of from 0.5 m. to 4 m., and constitutes a new record for Dunbarton (99). A revision of the *Pisidium* spp. and other freshwater bivalves in the West of Scotland is being attempted, and the author would be grateful for any living specimens accompanied by full notes on the locality.

## (2) Glasgow District.

The records presented in this section result from collections made at several points in the Monkland Canal, and in a large pool in an abandoned quarry at Westerhouse, one mile north



of Baillieston (all localities in vice-county 77, Lanark). The waters of these localities are harder than is usual in the West of Scotland: the quarry pool lies in a place where a teschenite sill cuts through the coals, shales and limestones of the Productive Coal Measures. The Monkland Canal is becoming increasingly polluted, especially in the region of new house building from Riddrie to Queenslie. Along that stretch it appears that the only snail now present is *Lymnaea peregra*, and many types of insect larvae known to be living there up to 1946 are now absent.

*Valvata cristata* Müller, Flat Valve Snail.

This snail occurs in the Westerhouse quarry pool. Although probably widespread in the Lowland parts of the West of Scotland, confirmed records of the species are few and scattered.

\**Planorbis carinatus* Müller, Keeled Ram's-horn.

Living specimens of this snail have been collected in the Monkland Canal just west of Coatbridge, establishing a new record for vice-county 77 (Lanark). The shell form in this locality is very much closer to the typical *P. carinatus* of England than are the shells of specimens from the Island of Lismore (see below).

\**Planorbis planorbis* (L.), The Ram's-horn.

Living snails of this species were collected in the Westerhouse quarry pool. This is a new record for Lanark (vice-county 77), although *P. planorbis* is probably more frequent in the lowlands of Scotland than *P. carinatus* (Ellis, 1951); and it is a snail which can live in smaller bodies of water than the latter species.

*Acroloxus lacustris* (L.), Lake Limpet.

No new vice-comital record is reported, but this species has been confirmed to occur in the Monkland Canal (both at Garthamlock Bridge and between Easterhouse and Bargeddie), while an abundant population has been found in the Westerhouse quarry pool. Breeding adults from the Westerhouse locality were of unusually large size (*i.e.* the mean shell-length was 7.9 mm.). According to Hunter (1953a) the mean shell-length of breeding adults in a Surrey population was 5.38 mm. (the maximum shell-length being 7.2 mm.), and a population of the same limpet in Bishop Loch, Lanarkshire had a mean shell-length of 5.2 mm. (the maximum length being 6.2 mm.). The quarry pool provides very good conditions for freshwater



snails : *Lymnaea (Radix) peregra* (Müller), *Physa fontinalis* (L.) and *Planorbis (Gyraulus) albus* Müller occurring as well as the three species mentioned above. Several larval cases of a limnophilid caddis were collected, the case material being almost entirely snail shells (including *Planorbis albus* and *Valvata cristata*, and juvenile shells of *Lymnaea peregra* and *P. planorbis*).

*Sphaerium (Musculium) lacustre* (Müller).

Many dead shells of this bivalve were found in foul-smelling mud in the Monkland Canal at Garthamlock Bridge, and at Bartibeith Bridge. They were of relatively large size (valve-length = 8.6 mm.). The species has been recorded before for Lanark, but is absent from all the vice-counties to the north and west of this. The related species, *S. corneum* (L.), is, of course, abundant in many localities throughout the West Highlands. It may be that the populations of *S. lacustre* in the Monkland Canal have already been killed off by pollution.

### (3) Island of Lismore.

Short visits were made in the summers of 1953 and 1954 to the three freshwater lochs of Lismore. These lochs, Loch Baile a'Ghobhainn, Kilcheran Loch, and Fiart Loch, have long been known to be calcareous to an extent exceptional in Scotland (the waters of the first were found to have a calcium content of 60.6 mg. per litre—analysis by W. E. Tetlow, quoted in West, 1905), and to support a vegetation unique among Scottish lochs (West, 1905, 1910). The combination of rich flowering vegetation all heavily encrusted with lime, thick beds of brittle *Chara* spp., marginal shell-deposits like the sea-shore, and blue non-peaty water presents a very unusual aspect for a Scottish loch. Fourteen species of freshwater snails have already been noted, and it is hoped to make a more detailed survey of the lochs in the near future, and if possible prepare an account of their molluscan ecology. This present paper only notes the occurrence of two species which constitute new vice-comital records for Main Argyll (98). The occurrence of *\*Potamopyrgus jenkinsi* (Smith) in Loch Baile a'Ghobhainn also established a new vice-comital record which has already been reported (see the *addendum* to Hunter, 1953c, in this journal).

*\*Lymnaea stagnalis* (L.), Great Pond Snail.

Specimens of this snail were found in Loch Baile a'Ghobhainn and in Kilcheran Loch. This species had not previously been recorded in highland Scotland or in the Islands.

\**Planorbis carinatus* Müller, Keeled Ram's-horn.

This species occurs in all three Lochs on Lismore. In Loch Baile a'Ghobhainn and Fiart Loch, *P. carinatus* was the most abundant species in the shell deposits, *Lymnaea peregra* being the next most frequent. (In Killeheran Loch shells of *Sphaerium corneum* are the "dominant" forms in the deposits.) Mr. A. E. Ellis has confirmed the present author's opinion that the shells of *P. carinatus* from Lismore conform to var. *dubia* Hartmann, which is known to be the prevalent form in the north-east of Ireland (Stelfox, 1911). The significance of this may be discussed later.

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Voucher specimens for all new vice-comital records reported above have been submitted to, and confirmed by, the Recorder of the Conchological Society: four have already been noted in his annual report (Ellis, 1954), and the rest will be so noted.

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# LIST OF FIRST ARRIVALS OF SUMMER BIRDS IN CLYDE AREA IN 1954. COMPILED FROM REPORTS OF MEMBERS AND FRIENDS

BY THOMAS ROBERTSON

| <i>Bird</i>                          | <i>Date</i>                                 | <i>Locality</i>  | <i>Average<br/>Date<br/>over 60<br/>years</i> | <i>Earliest<br/>Date, 19 54</i> |
|--------------------------------------|---|--|---|---------------------------------|
| <b>Lesser Black-<br/>Backed Gull</b> | Feb. 24<br>Feb. 27<br>Mar. 7                | Richmond Park, Glasgow<br>Hamilton<br>Helensburgh        | Mar. 6  | Feb. 8                          |
| <b>Wheatear</b>                      | Mar. 24<br>Mar. 26<br>Mar. 29               | Dalry<br>Oatlands, Glasgow<br>Southend, Kintyre          | Mar. 24                                       | Mar. 14                         |
| <b>Chiffchaff</b>                    | Mar. 28<br>Mar. 31<br>April 8               | Southend, Kintyre<br>Pollok Park, Glasgow<br>Helensburgh | April 8                                       | April 19                        |
| <b>Sand Martin</b>                   | Mar. 30<br>April 17<br>April 18<br>April 18 | Carlisle<br>Dalry<br>Hamilton<br>Helensburgh             | April 8                                       | April 8                         |
| <b>Swallow</b>                       | Mar. 28<br>April 7<br>April 16<br>April 18  | Gartocharn<br>Summerston<br>Possil Marsh<br>Rothesay     | April 10                                      | April 12                        |
| <b>Willow<br/>Warbler</b>            | April 16<br>April 17<br>April 21            | Girvan<br>Southend, Kintyre<br>Dalry                     | April 12                                      | Mar. 25                         |
| <b>Cuckoo</b>                        | April 17<br>April 24<br>April 25            | Lochwinnoch<br>Loch Lomond (Inchtavannich)<br>Glen Croe  | April 22                                      | April 22                        |
| <b>Common<br/>Sandpiper</b>          | April 18<br>April 26                        | Bothwell Bridge<br>Helensburgh                           | April 13                                      | April 12                        |
| <b>Tree Pipit</b>                    | April 24<br>May 8<br>May 12                 | Loch Lomond (Endrick)<br>Loch Ard<br>Drymen              | April 23                                      | April 18                        |
| <b>White Wagtail</b>                 | April 27                                    | Hamilton   | April 4                                       | April 1                         |
| <b>Yellow<br/>Wagtail</b>            | April 27                                    | Hamilton   | April 21                                      | April 26                        |

| <i>Bird</i>                              | <i>Date</i>                   | <i>Locality</i>   | <i>Average<br/>Date<br/>over 60<br/>years</i> | <i>Earliest<br/>Date, 1953</i> |
|--|-------------------------------|---|---|--------------------------------|
| <b>Whinchat</b>                          | April 25<br>April 27<br>May 1 | Helensburgh<br>Dalry<br>Southend, Kintyre                 | April 28                                      | April 29                       |
| <b>House Martin</b>                      | May 1<br>May 2<br>May 8       | Girvan<br>Helensburgh<br>Dalry                            | April 25                                      | April 19                       |
| <b>Corncrake</b>                         | May 1<br>May 4                | Dalry<br>Southend, Kintyre                                | April 25                                      | April 27                       |
| <b>Terns<br/>(Common<br/>and Arctic)</b> | May 6<br>May 7<br>May 8       | Southend, Kintyre<br>Helensburgh<br>Loch Lomond (Endrick) | May 6   | April 29                       |
| <b>Common<br/>Whitethroat</b>            | May 7<br>May 7<br>May 9       | Dalry<br>Helensburgh<br>Strathblane                       | May 1   | April 23                       |
| <b>Swift</b>                             | May 7<br>May 8<br>May 8       | Catheart<br>Dumbarton<br>Helensburgh                      | May 2   | May 3                          |
| <b>Redstart</b>                          | May 8<br>May 9<br>May 9       | Loch Ard<br>Helensburgh<br>Killearn                       | April 26                                      | April 21                       |
| <b>Sedge<br/>Warbler</b>                 | May 8<br>May 8<br>May 12      | Loch Lomond (Endrick)<br>Southend, Kintyre<br>Helensburgh | May 2   | April 29                       |
| <b>Wood Warbler</b>                      | May 8<br>May 8<br>May 12      | Loch Ard<br>Balmaha<br>Drymen                             | May 2   | April 25                       |
| <b>Grasshopper<br/>Warbler</b>           | May 8                         | Loch Lomond (Endrick)                                     | May 5   | May 6                          |
| <b>Garden<br/>Warbler</b>                | May 9<br>May 12               | Lake of Menteith<br>Balloch Park                          | May 8   | Mar. 30                        |
| <b>Spotted<br/>Flycatcher</b>            | May 10                        | Helensburgh   | May 10  | May 6                          |
| <b>Sandwich<br/>Tern</b>                 | April 16                      | Girvan  | Seldom<br>reported                            | April 6                        |



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## NOTES FROM EXCURSION AND SECTIONAL REPORTS

(1954)

(Full reports may be consulted at the Library)

**Botanical Section.**

On an excursion to the Cleghorn district of Lanarkshire on 1st May, a party of the section led by Mr. Wm. A. Scott noted *Vinca minor* L. and *Adoxa moschatellina* L. in flower in Cleghorn Woods; *Lathraea squamaria* L. and *Chrysosplenium alternifolium* L. in flower in Leechford Woods; and several plants of *Allium paradoxum* (M. Bieb.) G. Don. Mr. John Boyd reports that on the excursion to Greta Falls, by Largs, on 5th June, the crested hair-grass (*Koeleria gracilis* Pers.) and *Epilobium pedunculare* A. Cunningham were among the plants noted.

Mr. Richard Prasher has reported on a successful excursion, arranged by Mr. B. W. Ribbons, to Ben Ledi on 26th June, when the section joined an extra-mural class of the University of Glasgow. Typical plants of Scottish mountains were noted, including three species of *Lycopodium*, four species of *Saxifraga*, *Silene acaulis* L., *Thalictrum alpinum* L., *Oxyria digyna* (L.), and perhaps most noteworthy: *Cornus suecicum* (L.). On an excursion in the Balfroon district on 12th June, 86 species of plants were noted in bloom including: *Dicentra eximia* Torr., *Claytonia alsinoides* Sims, *Veronica montana* L., *Stellaria nemorum* L., and *Moehringia trinervia* (L.). Among the plants of interest noted on other excursions, Mr. Prasher records the following: *Daucus carota* L., *Plantago coronopus* L., and *Listera ovata* (L.) at Heads of Ayr; *Potentilla norvegica* L. by the Bishopton-Langbank road; and *Allium carinatum* L., *Lythrum salicaria* L., *Lysimachia vulgaris* L., *Poterium canadense* Gray, and *Centaureum minus* Moench on the banks of the River Don, by Ayr. Several plants of the royal fern (*Osmunda regalis* L.) were noted on an excursion led by Mr. A. Slack along the shore of the Clyde west of the River Leven.

**Other Sections.**

Five summer excursions, including three to the Arden Basin, and a monthly series of winter meetings were held by the Geological Section. Three field excursions, to Inverkip, Fin Glen, and Kilmacollm, were held by the Entomological Section. Among the more interesting birds observed by members of the Ornithological Section, Miss Mabel G. Scott reports an American wigeon, seen at Hamilton on the loch at the rubbish dump, and Bewick's swans and smew in the same area early in the year. In the autumn a great northern diver was observed on Hogganfield Loch and, at the end of the year, two long-tailed duck on the Tulla Loch, Milngavie.

## DIGEST OF THE PROCEEDINGS OF THE SOCIETY

12TH JANUARY, 1954.

Dr. Patton presided over this meeting which was held in the Kelvingrove Museum.

Three new members were admitted :—Mr. Edwin Kellock and Mrs. Beatrice A. Kellock, 21 North View, Westerton; Mrs. Myra Russell Hunter, 24 Sinclair Street, Helensburgh, Dunbartonshire.

Mr. C. Eric Palmar, A.R.P.S., presented the exhibition of the Photographic Section.

9TH FEBRUARY.

Dr. Patton presided over the Annual Business Meeting.

Reports on the Society's activities were read by office-bearers and conveners of Sections. New office-bearers were elected (see p. 214); and Miss Mabel G. Scott agreed to act as convener of the Ornithological Section.

9TH MARCH.

Dr Patton presided.

Mr. Alexander Gowans, 83 Brockburn Road, S.W.3, was admitted as a new member.

Professor T. Neville George, D.Sc., F.R.S.E., delivered a lecture on "Landscape in the Desert."

12TH APRIL.

Dr. Patton presided.

Mrs. W. Slack, 195 Wilton Street, N.W., was admitted as a new member.

An address entitled, "The way that we went," dealing with localities of botanical interest in Ireland associated with R. Lloyd Praeger, was given by Messrs. R. Mackechnie, B.Sc., A.L.S.(Hon.), and B. W. Ribbons, B.Sc., F.L.S.

10TH MAY.

Dr. Patton presided.

Four new members were admitted :—Miss Edith Wilson, B.Sc., 15 Hathaway Drive, Giffnock; Mr. Francis Gormley, B.A., 116 Quarrybrae Street, Parkhead; Miss Edna H. Land, 7 Millbrae Crescent, S.2; Miss Elizabeth MacDougall, 1503 Dumbarton Road, W.4.

Mr. A. Slack, B.Sc., delivered a lecture on British orchids, which was illustrated by his colour slides of twenty-six species.

#### 14TH JUNE.

Dr Patton presided.

Mr. Thomas Robertson submitted his list of first arrivals of Summer Birds in the Clyde Area (see page 212).

The Annual Exhibition was held, with contributions representative of all the Sections.

#### 12TH OCTOBER.

Mr. R. Mackechnie, B.Sc., A. L. S. (Hon.), Vice-President, was in the Chair.

Two new members were admitted :—Miss Hilda M. McNeil, M.B., Ch.B., 103 Randolph Road, W.1 ; Mr. Charles M. Morrison, M.A., 119 Balshagray Avenue, W.1.

Mr. John R. Lee, M.A., and Dr. Donald Patton lectured on, “ Ben Lawers—Past and Present ” (see p. 184).

#### 9TH NOVEMBER.

Dr. Patton presided.

Mr. T. Robertson read an obituary of Mr. Thomas Russell who died on 27th October, 1954, having been a member for fifty years.

Dr. W. Russell Hunter gave an address entitled, “ One View of Jamaica ” (see p. 173).

#### 14TH DECEMBER.

Dr. Patton presided.

Two new members were admitted :—Mr. Francis H. V. McFadyen, 133 Stevenson Street, S.3 ; Mr. James D. N. Morton, 129 Woodstock Avenue, Glasgow.

Mr. Wm. J. Cannon gave an address entitled “ Observations on Exotic Fishes ” (see p. 189).





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# The Glasgow ❖❖ Naturalist

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# CONTENTS

| PAPERS—   | PAGE |
|---|------|
| A new sub-species of Charr from Loch Eck                                      |      |
| G. F. Friend      ...      ...      ...      ...      ...                     | 219  |
| Additions and corrections to the moss flora of Dunbartonshire                 |      |
| A. C. Crundwell      ...      ...      ...      ...      ...                  | 221  |
| Notes on the food and parasites of Pike ( <i>Esox lucius</i> ) in Loch Lomond |      |
| W. O. Copland      ...      ...      ...      ...      ...                    | 230  |
| Records of the arrival of summer birds—Summary of Results                     |      |
| Thomas Robertson      ...      ...      ...      ...      ...                 | 236  |
| A note on <i>Plumatella</i> and <i>Ancylus</i> in a mountain lochan           |      |
| W. Russell Hunter and M. Russell Hunter      ...      ...                     | 241  |
| Notes on the Hydromedusae of the Clyde sea area with new distribution records |      |
| M. Vannucci      ...      ...      ...      ...      ...                      | 243  |
| A key to the British species of the genus <i>Cyclops</i> O. F. Müller         |      |
| F. E. Slack      ...      ...      ...      ...      ...                      | 250  |
| List of first arrivals of summer birds in Clyde Area in 1955                  |      |
| Compiled by Thomas Robertson      ...      ...      ...                       | 257  |
| ACKNOWLEDGMENT      ...      ...      ...      ...      ...                   | 256  |
| LIST OF OFFICE-BEARERS      ...      ...      ...      ...      ...           | 259  |
| NOTES FROM EXCURSION AND SECTIONAL REPORTS                                    | 260  |
| DIGEST OF THE PROCEEDINGS OF THE SOCIETY      ...                             | 261  |

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THE JOURNAL OF THE  
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## A NEW SUB-SPECIES OF CHARR FROM LOCH ECK

By G. F. FRIEND, Dept. of Zoology, University of Edinburgh ;  
communicated by H. D. SLACK, Dept. of Zoology, University  
of Glasgow

(*MS received 1st May, 1956*)

About a hundred freshwater lochs in Scotland, according to various scattered records, have—or have had in the past—their own self-contained and isolated populations of charr.\* These interesting, beautiful and rare fish, essentially a part of the British glacial-relict fauna, are nowadays more often reported to be missing from lochs in which they were once known than they are found in new ones. Charr, for instance, were once well known in both Loch Leven and St. Mary's Loch, but they have disappeared from these waters within the last century or two. It was particularly pleasing therefore to hear of a race of charr in a well-known loch from which they have not been recorded before, and strangely enough from one which is well worked over by anglers.

Fishing under scientific licence for powan in Loch Eck, Cowal, Argyllshire, in September, 1955, Dr. H. D. Slack and Mr. J. D. Hamilton, from the Zoology Department, Glasgow, took upwards of fifty quite unusual charr. The nets used ranged in mesh-size from 2 to 2.5 inches across the stretched diamond. The Zoology Department in Edinburgh, which is building up a large collection of Scottish and other charr, was told of the catch and the charr are being examined there at present.

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\* It is clear, for a variety of reasons, that the older spelling "charr" is the more correct one.



These Loch Eck charr, compared with a generalised or standard type of freshwater charr, are a moderately small race. Most specimens were in their 5th year and are nearly all within the  $200 \pm 25$  mm. size range, *i.e.* their total length is round about 8 inches. The combination of exceptionally large and bulging eyes with a low interorbital dome between the eyes, gives the heads of these charr a rather frog-like appearance. Their fins, particularly the pectorals and caudals are larger than most. A number of less obvious features are distinctive.

Loch Eck charr, too, have an unusual coloration. Examined in Edinburgh, after fixation in formalin, the skin has much less melanin pigment than the generality of charr and over the greater part of the flanks and the belly it is so translucent that the myocommata are visible. None of the red, pink or white spots so typical of most charr can be seen anywhere. In spite of the adult status of the sample, up to 12 parr-marks, normally only seen in juveniles, can be counted on the sides. Without exception too, all the Eck fish have patches of golden yellow (approximately the colour Aureolin, 3/1 in *Wilson's Colour Chart, British Colour Council*) on and around the maxillae, cheeks and opercula. In some fish this is repeated at the base of the caudal fin. The belly in a few fish has a more orange tinge (*Wilson's Colour Chart, Yellow Ochre, 07/1*).

In the *New Statistical Account of Scotland*, volume VII, p. 591, the Revd. M. Mackay, minister of Dunoon and Kilmun, reporting in 1845 on the fishes of Loch Eck, mentions salmon-trout, trout and eels but no charr. He does, however, have something to say about a "Goldie," ending his account with the honest words, "no specimen of it has happened to be seen by the writer." He includes, however, the following details, which he must have had from some one who had actually seen the "Goldie":

- (i) "not more than four or five inches long,"
- (ii) "beautiful golden hue when out of the water,"
- (iii) "when held up by the hand it appears almost transparent."

Apart from the reference to size, the two other characters—golden colour and "transparency"—do strongly suggest that the new charr is the old "Goldie." I propose, however, that the sub-specific name *youngeri* be given to this fish in recognition of the kindness of John Younger, Esq., who gave permission for the netting in Loch Eck, and that in future the Loch Eck charr be known more precisely as *Salvelinus alpinus youngeri* rather than by the old local name, the Goldie.

## ADDITIONS AND CORRECTIONS TO THE MOSS FLORA OF DUNBARTONSHIRE

By A. C. CRUNDWELL, Department of Botany, University of  
Glasgow

(*MS. received 27th July, 1956*)

The moss flora of the Glasgow district has been studied by local botanists ever since the end of the eighteenth century, and their work has led to the publication of several valuable local floras and lists. Of these the fullest and most recent, as well as the most reliable, is that of Murray (1901), which covered the whole of the Clyde Area. It is the aim of this paper to bring Murray's flora up-to-date as far as Dunbartonshire is concerned.

There are, unfortunately, two drawbacks to using Murray's list as a basis for a flora of the county. In the first place he recognised only a very limited number of varieties; and while many of those that he rejected are excluded from the current list of British mosses (Richards and Wallace, 1950), others are still maintained, or even considered distinct species. In the second place, the distribution of the species is recorded not by counties or vice-counties, but by a grid based upon latitude and longitude. Whatever the merits of this system, it has not proved popular, and it would be a mistake to resurrect it.

In this paper, Dunbartonshire is to be understood as equivalent to vice-county 99. The detached portion, which counts as part of Stirlingshire, is excluded, and the boundaries followed are those of 1852. Milngavie, now in Dunbartonshire, was then in Stirlingshire; and some ground in the south of the county has since been lost to Glasgow. These revisions of the county boundaries have not unnaturally led to a few erroneous records.

In 1907 the Moss Exchange Club (now the British Bryological Society) published the *Census Catalogue of British Mosses*, showing the vice-comital distribution of the British species and varieties. A second edition appeared in 1926, and a supplement to it in 1934. Since then an annual list of new records has been published in the Society's journal. A third edition is now in preparation. The compilers of the first edition of the Census Catalogue tapped a number of sources of records not available to Murray; but they also neglected a number of good records and included others which it has proved impossible to verify. Some of these are probably represented by herbarium specimens that I have not seen, while others are probably based upon manuscript lists that have now perished, or are errors.

A thorough search of the published literature has yielded a few records that Murray did not include. The excursion accounts and reports of meetings of the Glasgow Society of Field Naturalists and of the Natural History Society of Glasgow have proved particularly useful. A somewhat controversial paper is Stirton's (1876a) list for the West of Scotland, which contains a number of errors. Some of the rarer species recorded by Stirton have been included in Murray's flora, and have got into the Census Catalogue. Those thought likely to be errors have been excluded or treated as doubtful. This procedure has not been very satisfactory, for a number of important finds have been ignored, and some errors have been accepted. Stirton evidently had a very keen eye in the field, but was less competent with the microscope. His herbarium contains some extraordinary misidentifications. I have, therefore, accepted no record on Stirton's authority alone; but if a specimen is known to have been examined and passed by Braithwaite, by Dixon or by some other competent authority then I have not necessarily searched for and examined a specimen myself.

Herbaria examined include those of Glasgow University; the British Museum; The Glasgow Museum, Kelvingrove; and the Royal Technical College, Glasgow. These include the herbaria of nearly all the principal collectors in the county. The main omissions are those of A. M'Kinlay and D. A. Boyd, which have been destroyed, and that of J. Murray, the whereabouts of which is unknown to me.

I have not considered the genus *Sphagnum* in this paper as there have been too many changes in its taxonomy since the beginning of the century for Murray's list to serve as a basis for a flora now.

A large number of species Murray considered too common for the citation of precise localities, and recorded them only by letters, denoting grid squares. All of these are recorded from Dunbartonshire except (in Murray's nomenclature): *Seligeria recurvata*, *Dicranella cerviculata*, *D. crista*, *Orthotrichum cupulatum*, *O. rivulare*, *Tetraplodon mnioides*, *Mnium affine*, *Anomodon viticulosus*, and *Hypnum chrysophyllum*. Similarly, all those recorded for Loch Lomond by Murray are reliably recorded from Dunbartonshire, with the exception of those discussed below.

In the following list I have included all necessary additions and corrections to Murray's flora apart from those noted by Lee (1911); but I have not listed any additional localities for species already recorded for the county. I have used modern nomenclature, but have kept to the order of Murray's flora, which is also that of the Census Catalogues. "New"



county records. *i.e.*, those not in the second edition of the Census Catalogue nor in any of the supplementary lists, are marked with an asterisk(\*). An exclamation mark after the name of the collector signifies that I have seen a specimen, one after the locality that I have seen the species in question growing there in the years 1949-56. Records cited without authority are my own. Most of these have been confirmed by Dr. E. F. Warburg.

*Andreaea Rothii* W. & M. var. *falcata* (B. & S.) Lindb. ex Braithw. Ben Vorlich, 1865, *G. E. Hunt* ! Near Tarbet, *Lee* !

*Polytrichum aurantiacum* Funck (*P. gracile* Sm.). Record in Cens. Cat., ed. 1.

*Buxbaumia indusiata* Brid. Recorded by Stirton (1876a) from Loch Lomond, but his specimen (near Tarbet, 1875), is *B. aphylla*, as he subsequently realised.

*Pseudephemerum nitidum* (Hedw.) C. Jens. (*Pleuridium axillare* (Dicks.) Lindb.). Bank of the Craigton Burn.

*Ditrichum cylindricum* (Hedw.) Grout (*D. tenuifolium* Lindb.). Very common in arable fields throughout the county.

*Seligeria Doniana* (Sm.) C. M. In ravine near Arrochar station.

*Rhabdoweissia crenulata* (Mitt.) Jameson. Ben Vorlich !, *Lee*.

*Oncophorus Wahlenbergii* Brid. Ben Vorlich, 1895, *W. Smith* !

\**Dichodontium flavescens* (Turn.) Lindb. Reported by Boyd from Kilmahew, near Cardross, on a Natural History Society excursion, 1891. Perhaps best regarded as doubtful in the absence of a specimen. Sterile plants that may well be this species occur in the woods at Arrochar.

*Dicranella Schreberiana* (Hedw.) Dix. Loch Humphrey Burn, 1912, *J. G. Robertson* !

*Campylopus subulatus* Milde. Ben Vorlich, 1864, *Stirton*. Shore of Loch Lomond near Tarbet, *W. E. Nicholson*.

\**C. Schimperii* Milde. Ben Vorlich, 1876, *J. Allan*, on Field Naturalists excursion (sub nom. *C. compactus*).

*Dicranum falcatum* Hedw. Record in Cens. Cat., ed. 1.

*D. Blyttii* B. & S. On rocks on east side of Ben Vorlich, at 2,200-2,300 feet alt.

*D. montanum* Hedw. Glenarbuck, *Lee* !

*Fissidens exilis* Hedw. Drumchapel, *Lee* ! Glenarbuck.

\**F. viridulus* (W. & M.) Wahl. Wilkie's record from Mains, listed by Murray, seems to have been overlooked by the compilers of the Census Catalogue.



*F. pusillus* Wils. ex Milde. The plant now known, probably incorrectly, as *F. minutulus* Sull. sec Braithw. has been confused with this in the past; but all the Dunbartonshire specimens that I have seen are the true *F. pusillus*.

*F. Curnowii* Mitt. Near Ardlui, 1929, *B.B.S. excursion*.

*Grimmia alpicola* Hedw. var. *rivularis* (Brid.) Broth. Frequent on rocks in streams; and at the shore of Loch Lomond, near Lorn.

*Grimmia apocarpa* Hedw. var. *gracilis* (Schleich.) W. & M. Killoeter, on rocks in small quantity.

\**G. funalis* (Schwaegr.) B. & S. and \**G. torquata* Hornsch. ex Grev. Ben Vorlich, 1876, *Allan*, on Field Naturalists excursion (sub nom. *G. spiralis* and *G. torta*).

*G. pulvinata* (Hedw.) Sm. var. *africana* (Hedw.) Dix. (var. *obtusa* (Brid.) Hueben.). Record in Cens. Cat., ed. 1.

*G. orbicularis* Bruch ex Wils. Recorded from Bowling by Stirton (1876a). The only specimen I have been able to find, dated 1864, is a very battered one mounted on an unprotected sheet of paper. It is *G. pulvinata*, and may well have been the var. *africana*, but any capsules that were there have been rubbed off.

*Grimmia Stirtoni* Schp. Record in Cens. Cat., ed. 1. Perhaps based on plants collected by Stirton from near Croy (apparently the *locus classicus*) which is in the detached part of the county, or perhaps on other gatherings of his from Milngavie.

*G. subsquarrosa* Wils. ex White. Both the records given by Murray need comment. Dixon's Loch Lomond plant was collected from the shore near Tarbet (Dixon, 1899) and is likely to have been *G. retracta*, which was at that time confused with it. There is no specimen in Dixon's herbarium at Kew. Stirton's fruiting gathering from Dumbuck seems to have been a mixture of fruiting *G. trichophylla* and sterile *G. subsquarrosa*. He also collected *G. subsquarrosa* from Bearsden.

*G. decipiens* (Schultz) Lindb. Murray attributes records of this from Cardross and Dumbuck to Stirton. The Cardross record I can find in none of Stirton's publications, and there is no specimen in his herbarium. A plant labelled "Nr. Bowling, 1865" is probably the Dumbuck one. It is the var. *robusta* (Ferg. ex Braithw.) Braithw.

*G. retracta* Stirt. Frequent on boulders by the shore of Loch Lomond.

*Dryptoden patens* (Hedw.) Brid. (*Grimmia patens* (Hedw.) B. & S.). On rocks by stream, Stuckindroin Ravine, Ben Vorlich.

\**Rhacomitrium ellipticum* (Turn.) B. & S. Ben Vorlich !, 1823, Arnott.

*Campylostelium saxicola* (W. & M.) B. & S. On rocks in wood by Loch Lomond, Balloch Park and near Lorn.

*Acaulon muticum* (Brid.) C. M. Hills near Bowling, 1864, Stirton !

*A. triquetrum* (Spruce) C. M. Hills near Bowling, 1864, Stirton !

These two species are mixed in one gathering and were evidently growing together. The latter is a most surprising find, for the only other reliable British records are from the south coast of England.

*Phascum cuspidatum* Hedw. Stubble field near Bearsden.

*Pottia recta* (Sm.) Mitt. Stirton's record from near Bowling is unsupported by any specimen, and must be treated as doubtful since the species is otherwise unknown from the west of Scotland.

*P. intermedia* (Turn.) Fühnr. Record in Cens. Cat., ed. 1.

*Pterygoneurum ovatum* (Hedw.) Dix. (*Tortula pusilla* (Hedw.) Mitt.). The record in Murray and in the Census Catalogue is apparently based on that in Hooker (1821): "Dumbarton and Angus-shire, *D. Don.*" As the species is decreasing in frequency in Britain, confirmation of its continued presence in the county is desirable.

*Aloina aloides* (Schultz) Kindb. Record in Cens. Cat., ed. 1.

*Tortula marginata* (B., S. & G.) Spruce. Near Dumbarton, 1865, Stirton ! The record was treated as doubtful by the compilers of the census catalogue, but the specimen is correct. On old mortar of sheltered wall, Ardmay, Loch Long. These are the only Scottish records, and the northernmost localities of the species.

*T. intermedia* (Brid.) Berk. I can find no specimen to support Stirton's record of this from Bowling ; but the record is a likely one.

\**T. subulata* Hedw. var. *Graeffii* Warnst. Near Greenside Reservoir, Kilpatrick Hills, in small quantity. A form with larger papillae than usual, but very distinct from the smaller and more obtuse-leaved plants of var. *subulata* growing nearby.

*Tortula ruralis* (Hedw.) Crome. The Census Catalogue record is presumably based on a specimen in the British Museum : Trap Rocks at Bowling Bay, 1840, *G. J. Lyon*. The plant is, however, *T. princeps*.

*Barbula ferruginascens* Stirt. Ben Vorlich, on rocks at 2,200 feet. Silt-covered rocks in stream, Glen Douglas.

\**B. spadicea* Mitt. Cardross, 1866, *Stirton* (as *B. vinealis*) ! The Census Catalogue record of *B. vinealis* seems to be based on this plant, and should be deleted. Walls at Ardarroch and at Rossdhu, Loch Lomond.

\**B. acuta* (Brid.) Brid. (*B. gracilis* (Schleich.) Schwaegr.). Reported for Bowling by *Stirton* (1876a), but I can find no specimen. However, his herbarium contains one from Cardross, 1869, which is correct (conf. Warburg) and fruiting. I know of no other record of fruit from this country. Dixon (1924) says of this species, "Sterile in Britain."

*B. convoluta* Hedw. var. *commutata* (Jur.) Husn. Wall near Rahane, Gareloch, *Lee* ! Wall at Creagan Sithe, Loch Long.

*Leptodontium recurvifolium* (Tayl.) Lindb. *Stirton* (1876) noted his inability to find this species in M'Kinlay's locality on Ben Vorlich, and as it has not been seen since in the county it must be reckoned extinct.

\**Weissia microstoma* (Hedw.) C.M. Kilpatrick Hills above Bowling, 1842, *F. Adamson* ! Near Greenside Reservoir.

*Gymnostomum calcareum* Nees & Hornsch. On rocks in ravine near Arrochar station.

*Trichostomum brachydontium* Bruch var. *littorale* (Mitt.) C. Jens. Ardlui, *E. M. Lobley*. An ill-defined variety, rather frequent round the shores of Loch Lomond.

\**Encalypta ciliata* Hedw. Near Greenside Reservoir, Kilpatrick Hills ; a form with the calyptra not ciliate, and hence easily mistaken for *E. vulgaris*.

*E. vulgaris* Hedw. The Census Catalogue record appears to be based on a report of this species on a Natural History Society excursion in 1897 from the *E. ciliata* locality mentioned above. I have seen no specimen, but it is likely to have been an error for *E. ciliata*.

*Amphidium lapponicum* (Hedw.) Schp. Near Bowling, 1864, *Stirton*. Near Greenside Reservoir. Ben Vorlich.

*Zygodon conoideus* (Turn.) Hook. & Tayl. Rossdhu, Loch Lomond.

*Orthotrichum rupestre* Schleich. ex. Schwaegr. var. *Sturmi* (Hornsch.) Jur. Bowling, 1864, *J. Shaw* !

*O. anomalum* Hedw. All Dunbartonshire material that I have seen belongs to the var. *saxatile* (Wood) Milde.

\**O. pulchellum* Brunton. Bowling, *W. J. Hooker* !

*Splachnum ampullaceum* Hedw. Hill near Helensburgh, *Hopkirk* and *J. D. Hooker* (Hooker, 1833). Beinn-a-Mhanaich, 1893, *Natural History Society excursion*.

*Ephemerum serratum* (Hedw.) Hampe. On mole-hill, Auchinvenna Hill, Glen Fruin.

*E. minutissimum* Lindb. In two stubble fields at Caldarvan.



\**Physcomitrium pyriforme* (Hedw.) Brid. Field at Rosneath by the sea, *Lyon* !

*Funaria fascicularis* (Hedw.) Schp. There are several old specimens in herbaria labelled "*Gymnostomum fasciculare*." Some of these may be responsible for the Census Catalogue record ; but they all are *F. obtusa*.

*Conostomum tetragonum* (Brid.) Lindb. Record in Cens. Cat., ed. 1.

*Bartramia pomiformis* Hedw. var. *crispa* (W. & M.) B. & S. Ben Vorlich, 1842, *W. Gourlie* !, and 1865, *Hunt* !

\**Philonotis calcarea* (B. & S.) Schp. Ben Vorlich, 1873, *Stirton*, on Field Naturalists excursion. Best treated as doubtful in the absence of a specimen.

*Pohlia annotina* (Hedw.) Loeske. Frequent on footpaths, streambanks, stubble fields, etc., throughout the county.

*P. Rothii* (Correns) Broth. Ben Tharsuinn. Ben Vorlich. Probably only a stunted form of *P. Drummondii*.

*P. proligera* (Limpr.) Lindb. ex H. W. Arnell. Drumchapel specimens collected by Lee and responsible for the Census Catalogue record are all *P. annotina*, though Dixon would have included them in *P. proligera*, a species which he misunderstood.

*P. Drummondii* (C. M.) Andrews (*Webera commutata* Schp.). East side of Ben Vorlich, among rocks at 2,750 feet.

*Bryum erythrocarpum* Schwaegr. Frequent in stubble fields, on stream-banks, mole-hills, etc., throughout the county.

*B. bicolor* Sm. (*B. atropurpureum* W. & M.). Wall, Gareloch, 1883, *G. Horn* ! Drumchapel, *Lee* ! Dumbarton Rock. Stunted gemmiferous forms (var. *gracilentum* Tayl. ex. Braithw.) are frequent on roadsides, footpaths, old quarries, etc.

*B. murale* Wils. Record in Cens. Cat., ed. 1.

*B. alpinum* Brid. var. *viride* Husn. On flat rock at roadside, Glenmallan, Loch Long. Kilpatrick Hills, near Craigton School.

*Cryphaea heteromalla* (Hedw.) Mohr. On elder in wood by shore of Loch Lomond, near Lorn.

*Antitrichia curtipendula* (Hedw.) Brid. Record in Cens. Cat., ed. 1.

*Heterocladium squarrosulum* (Brid.) B. & S. Auchingaich Burn, *Lee* !

*Thuidium delicatulum* (Hedw.) Mitt. Frequent in moist sheltered situations in the western and northern parts of the county.

*Orthothecium intricatum* (Hartm.) B. & S. On rocks in ravine near Arrochar station. Stuckindroin ravine, Ben Vorlich.



*Cirriphyllum crassinervium* (Tayl.) Loeske & Fleisch.  
(*Eurhynchium crassinervium* (Tayl.) B. & S.). Glenarbuck !, Lee.

*Rhynchostegiella tenella* (Turn.) Limpr. (*Eurhynchium tenellum* (Turn.) Milde). Near Cardross, 1863, Stirton !

\**Isothecium myosuroides* Brid. var. *brachythecioides* (Dix.) C. Jens. Ben Vorlich, 1864, M'Kinlay !

*Plagiothecium piliferum* (Sw. ex Hartm.) B. & S. Recorded from Ben Vorlich by Stirton (1906), but the plant is *P. elegans* (Dixon, 1923).

*P. striatellum* (Brid.) Lindb. Ben Vorlich !, M'Kinlay.

*P. silvaticum* (Brid.) B. & S. Tree-roots by stream, Milton, near Dumbarton. Rocks in wood near Whistlefield.

*Amblystegiella Sprucei* (Bruch) Loeske. Gallangad Glen, Lee ! Stuckindroin ravine, Ben Vorlich.

*Amblystegium compactum* (C.M.) Aust. Fruiting plants were recorded from Cardross by Stirton (1908). The only specimen I can find is labelled "nearest compactum," but is in fact *A. serpens*.

*A. varium* (Hedw.) Lindb. Edge of loch, Kilmahew, Cardross, Lee ! Damp rock-face in quarry near Dumbarton.

*A. riparium* (Hedw.) B. & S. Near Milton, Dumbarton, and Craigton Burn, both T. Hill ! Tree-roots by Loch Lomond, near Balloch.

*Campyllum elodes* (Spruce) Broth. Recorded from Cochno on a Natural History Society excursion in 1895, and hence in the Census Catalogue ; but the specimen (in herb. R. D. Wilkie) is not this, and the name was later corrected to *Hypnum* (i.e. *Drepanocladus*) *fluitans*.

*D. Sendtneri* (Schp.) Warnst. Recorded from Ben Vorlich by Stirton (1876a). The record is bracketed as doubtful in the Census Catalogue. There is no specimen in Stirton's herbarium, but one labelled "Arroquhar, Loch Long, 1868" is *D. vernicosus*.

*D. revolvens* (Turn.) Warnst. var. *intermedius* (Lindb.) Rich. & Wall. Auchinvinnal Hill. Ballevoulin Glen, Glen Fruin.

*Hypnum cupressiforme* Hedw. vars. *resupinatum* (Wils.) Schp. and *filiforme* Brid. Both frequent on tree-trunks. Var. *\*tectorum* Brid., on rocks near Greenside Reservoir, Kilpatrick Hills.

*Ctenidium molluscum* (Hedw.) Mitt. var. *condensatum* (Schp.) Braithw. Wet rocks by roadside, Ardmay, Loch Long.

*Hygrohypnum eugyrium* (B. & S.) Loeske. Recorded for Loch Lomond by Murray, and for the county in the Census Catalogue, but I know of no localised Dunbartonshire record.

*Acrocladium trifarium* (W. & M.) Rich. & Wall. Ben Vorlich, at 2,800 feet, on east side.

*A. giganteum* (Schp.) Rich. & Wall. Record in Cens. Cat., ed. 1.

\**Rhytidium rugosum* (Hedw.) Kindb. "On Ben Vorlich, by Loch Lomond side. . . *Mr. Arnott*" (Hooker and Taylor, 1827). There is no Ben Vorlich specimen in Arnott's collection, though there is one from Ben Lomond, a locality not mentioned by Hooker and Taylor. The record seems to require confirmation.

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# NOTES ON THE FOOD AND PARASITES OF PIKE (*ESOX LUCIUS*) IN LOCH LOMOND

By W. O. COPLAND

(MS. received 20th August, 1956)

## (a) Food

The food of the pike has been studied by several workers (Frost 1954, Hartley 1947, Hunt and Carbine 1951), and the voracious habits and predominantly piscivorous diet of this fish are well known. The most detailed account is that by Frost (1954), on the feeding habits of pike in Windermere, which is based on the examination of the stomach contents of some three thousand fish. In America, Hunt and Carbine (1951) have reported observations on the food of young pike in the drainage ditches of Houghton Lake, Michigan; Robertson (1886) has published the only record of the food of pike in Loch Lomond. He found a powan (*Coregonus chupeoides* Lacépède) in the stomach of a pike which measured 29 inches.

During the period January 1955 - July 1956, the stomachs of one hundred and two pike from the southern part of the loch have been examined and the findings are reported here. The food of small pike (less than 20 cm.) is considered separately from that of large pike (more than 20 cm.).

The frequency of occurrence of food organisms in the stomachs of fourteen small pike are shown in Table I. The 3-5 cm. group, caught at the end of May, were feeding on Entomostraca and the larvae of Chironomidae. The larger fish (5-19 cm.) were feeding mainly on *Asellus*, together with aquatic insect pupae and larvae. A young pike of 6 cm. was found in the stomach of one of 13.5 cm. In Windermere, Frost (1954) found that young pike fed initially on Entomostraca, which continued to be important until the pike were 5 cm. Fish entered the diet at 3.5 cm. and were an important part of it thereafter. Insect larvae, which were first eaten when the pike were 2.5-3 cm., and *Asellus* and *Gammarus* which were first eaten at 5.5 cm., were of secondary importance only. The main difference between the diet of fish between 5-19 cm. reported here and those in Windermere is the greater importance of *Asellus*, and aquatic insect larvae, and the lesser importance of fish to the former. This difference is almost certainly related to the site of capture of the young pike in Loch Lomond. The fish were taken from the Old Fruin, which is a weed-filled backwater left when the mouth of the River Fruin was diverted. The pike is the only abundant fish in this water although a few perch are present. The diet of the young pike in the Old Fruin is similar to that of young



pike in the drainage ditches of Houghton Lake, Michigan reported by Hunt and Carbine (1951).

TABLE I.

**Food of small pike (Less than 20 cm.): frequency of occurrence of each food organism in total fish examined.**

Fish caught by hand net and minnow seine in Old Fruin water.

| FOOD ORGANISM                                      | FREQUENCY        |                   | TOTAL  |
|--|------------------|-------------------|--------|
|  | (in fish 3-5cm.) | (in fish 5-19cm.) |        |
| <i>Esox lucius</i> ... ..                          | Nil              | 1(14%)            | 1(7%)  |
| <i>Asellus</i> ... ..                              | Nil              | 7(100%)           | 7(50%) |
| Aquatic insect pupae<br>(Chironomid and Mosquito)  | Nil              | 5(71%)            | 5(36%) |
| Aquatic insect larvae<br>(Chironomid and Mosquito) | 7(100%)          | 2(29%)            | 9(64%) |
| Cladocera ... ..                                   | 2(29%)           | Nil               | 2(14%) |
| Copepoda ... ..                                    | 3(43%)           | Nil               | 3(21%) |
| No. of fish examined, 7.                           |                  | 7.                |        |
| Total No. of small pike examined, 14.              |                  |                   |        |

TABLE II.

**Food of large pike (Over 20cm.): frequency of occurrence of each food organism in total fish examined.**

A. Fish caught by gill and seine net in Rossdhu, Arden, and Auchen-  
tullich bays.

Length range 22-101cm.  
Mean length 62.6cm.

| FOOD ORGANISM                               | FREQUENCY | %      |
|---|-----------|--------|
| <i>Coregonus clupeoides</i> (Powan) ...     | 12        | (17.1) |
| <i>Salmo trutta</i> (Brown and Sea trout)   | 5         | (7.1)  |
| <i>Salmo salar</i> (Salmon) ... ..          | 1         | (1.4)  |
| <i>Esox lucius</i> (Pike) ... ..            | 1         | (1.4)  |
| <i>Rutilus rutilus</i> (Roach) ... ..       | 1         | (1.4)  |
| <i>Phoxinus phoxinus</i> (Minnow) ...       | 1         | (1.4)  |
| <i>Gasterosteus aculeatus</i> (Stickleback) | 3         | (4.3)  |
| Undertermined fish fragments ...            | 1         | (1.4)  |
| Invertebrate organisms ... ..               | Nil       | Nil    |
| Total Number of fish examined               | 70        |        |
| Number of fish with food ...                | 25        |        |
| Percentage feeding ...                      | 35.7%     |        |

B. Fish caught by seine net in the Old Fruin water.

Length range 20-76cm.  
Mean length 39.8cm.

| FOOD ORGANISM                    | FREQUENCY | %      |
|----------------------------------|-----------|--------|
| <i>Esox lucius</i> (Pike) ... .. | 2         | (8.7)  |
| Undertermined fish fragments ... | 1         | (4.3)  |
| <i>Asellus</i> ... ..            | 12        | (52.2) |
| Chironomid pupae ... ..          | 2         | (8.7)  |
| Chironomid larvae ... ..         | 2         | (8.7)  |
| Trichopteran larvae ... ..       | 1         | (4.3)  |
| Total number of fish examined    | 23        |        |
| Number of fish with food         | 16        |        |
| Percentage feeding ...           | 69.6%     |        |



The frequency of occurrence of food organisms in the stomachs of ninety-three large pike is shown in Table II. The fish are considered in two separate groups. Most of the fish in Group A were caught in gill nets set during the period November - March in Rossdhu and Arden bays, and the remainder by seine netting in Auchentullich bay during the summer. The fish in Group B were all caught by seine net in the Old Fruin during March-July 1956. The pike in Group A were feeding solely on other fishes, and the powan (*Coregonus clupeoides* Lacépède) was the most frequent prey. There is insufficient data to analyse seasonal changes of diet in detail, but it was noted that powan were being taken particularly during November and December, and also during the summer. Frost (1954) has shown that seasonal changes in diet of pike in Windermere are almost entirely governed by the availability of the fish food species which is in turn an expression of the seasonal changes in habit of the different fishes. Shoals of powan are present in the littoral zone of Loch Lomond from May to December, and would provide a particularly easy prey when they are in shallow water for spawning during late December and early January. There is a notable absence of perch, which are the main food of pike in Windermere from May to September, and this may well be due to the availability of powan in Loch Lomond as an alternative food during the summer.

Large pike taken in the Old Fruin (Group B) were feeding mainly on *Asellus* together with larvae and pupae of aquatic insects and on small pike. The population in this water is poorly grown compared with that in the loch itself, and a ripe breeding female, taken in March and judged to be three years, measured only 25 cm. The slow rate of growth is undoubtedly related to the predominantly invertebrate diet of pike in the Old Fruin.

The small pike eaten each measured approximately 10 cm.

#### (b) Parasites

Pike were found to be infected with two species of parastic helminth. The pseudophyllidean cestode, *Triaenophorus nodulosus* Pallas 1760, occurred in the upper intestine, the scoleces of the worms being embedded in the intestinal wall immediately posterior to the pylorus. The acanthocephalan, *Acanthocephalus lucii*, Muller, 1779, occurred in the lower intestine.

*Triaenophorus nodulosus*, is a common tapeworm of pike both in European and North American lakes and rivers, and it has been recorded in several localities in southern England by Baylis (1928, 1939). The distribution of the species in Scotland appears to be limited, however, for it was not present

in pike examined from lochs Tummel, Choin, Kinardochy, and Leven (Robertson 1953), nor in pike from Lochmaben and lochs in the Achnasheen - River Conon district. Pike from Windermere, Tarn Hows, and Bassenthwaite were also uninfected. In Loch Lomond, *T. nodulosus* was found in 66% of the total number of pike examined. Infected fish harboured from one to thirteen worms. The tapeworms were present in fish from both the loch and the Old Fruin. There were marked seasonal changes in the proportion of mature and immature worms found at different times of year. Mature worms were found first in late November, together with many immature, and became increasingly frequent until March-April when the majority were gravid. At this time the tapeworms were very conspicuous and almost completely filled the lumen of the intestine. The strobilae were frequently entwined in a tangled mass. During April, lengths of strobila and occasionally whole worms were often found in the lower intestine and appeared to be passing out. Several lengths of strobila were passed out into an aquarium tank in which two pike were held during April. It was found that eggs were released from ripe proglottids in large numbers when these came in contact with water. During May, pike were found to be free of infection, and from June-October only immature worms were recovered. The smallest specimens measured only 3 cm. and were inconspicuous and often hidden in the copious intestinal mucus. Michajlow (1933) found a similar seasonal cycle of maturation and elimination of gravid worms in pike examined from lakes in Poland.

The life cycle of *T. nodulosus* has been studied by Miller (1943, 1945) in Canada. Ciliated coracidia hatch from the eggs and to develop further must be eaten by the copepod, *Cyclops*, in the body cavity of which they develop to the procercoid stage in 10-14 days. Development to the plerocercoid stage occurs if the *Cyclops* is eaten by a suitable fish. The plerocercoid is most frequently found encysted in the liver. The life cycle is completed when a fish infected with plerocercoids is eaten by a pike. A variety of fresh-water fishes are known to act as intermediate hosts of *T. nodulosus* in European lakes, and in southern England plerocercoids have been found in the peritoneum of sticklebacks and the liver of minnows. (Prudhoe, personal communication, British Museum 1956).

Eggs were cultured in the laboratory and hatching occurred after 7-10 days at room temperature. Large numbers of *Cyclops* were infected and fully developed procercoids observed after 14 days. The number of procercoids in a single copepod varied from one to twenty-nine. The infected *Cyclops* were fed to powan fry in the aquarium but no plerocercoids developed. Samples of trout, powan, perch, roach, sticklebacks

and minnows from the loch were examined for plerocercoids but none were found. Large numbers of perch and roach fry were also examined with negative results. The plerocercoids were subsequently found in the livers of young pike between 9-29 cm. The plerocercoids measured 1-2 cm. and although unsegmented possessed fully differentiated scolex hooks. They were enclosed in well defined cysts, each cyst containing one or two plerocercoids. The maximum number of cysts found in one fish was two. The plerocercoids were extremely active when released from their cysts and placed in 0.65% saline.

It is evident that pike fry will acquire infection when feeding on Entomostraca during their first summer. Pike spawn in Loch Lomond in late March and early April and the fry hatch about 14 days later. The fry start feeding after a further period of ten days during which they remain suspended attached to vegetation. Plerocercoids of *T. nodulosus* will be fully developed in *Cyclops* 3-6 weeks after the eggs are shed in March - April. Thus, the pike fry may become infected from the time they begin feeding until Entomostraca cease to be included in the diet. Penetration of the liver, cyst formation, and transformation to the plerocercoid stage must take from 2-4 months. Fully developed and encysted plerocercoids were found in small pike, judged to be 0+ fish, caught in late September. Miller (1945) has shown that the plerocercoids begin to degenerate after the second summer in the intermediate host and none are found in older fish. In Loch Lomond no plerocercoids were found in large pike infected with adult *T. nodulosus* in the intestine. Completion of the life cycle of *T. nodulosus* in Loch Lomond appears to depend entirely on the cannibalistic habit of pike, as no other fish has been found to be infected with the plerocercoids.

*Acanthocephalus lucii* was found in 39% of pike from the loch and 84% from the Old Fruin. The infection varied from one to forty worms in a single fish. All sizes of pike were infected with the exception of the smallest group (3-5 cm.). Occasional specimens were found in the upper intestine but the most were in the lower part. The probosces of the worms were often deeply embedded in the wall of the intestine. *A. lucii* was also found in the intestine of perch (*Perca fluviatilis*), roach (*Rutilus rutilus*), flounder (*Platessa flesus*), and occasionally powan (*Coregonus clupeoides*). In European lakes, this species occurs in a wide variety of freshwater fishes.

Eggs were often expelled by ripe females when these were placed in water. Early embryonic development takes place within the body of the female worm and when shed the eggs contain the first larval stage, or acanthor, fully developed. The acanthor is elliptical in shape and provided with a rostellum



armed with hooks. For further development to take place the acanthor must be ingested by a suitable intermediate host which in the case of *A. lucii* is the isopod, *Asellus*. The acanthor develops to a juvenile worm in the haemocoel of the intermediate host, and reaches maturity only when the *Asellus* is eaten by a suitable fish.

Numerous *Asellus* containing juvenile *A. lucii* in the haemocoel were recovered from the stomachs of pike, and several worms were found free in the stomach and upper intestine. No other invertebrate organisms were infected with this species. It is clear that the heavier infection of pike in the Old Fruin is related to the greater importance of *Asellus* in the diet of these fish.

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## RECORDS OF THE ARRIVAL OF SUMMER BIRDS— SUMMARY OF RESULTS

By THOMAS ROBERTSON

(MS. received 27th September, 1956)

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It is now over sixty years since first an organised watch was kept for the arrival of summer birds in the Clyde Area, and many bird lovers have contributed in their day to the records. Although the watch is still maintained and the annual list of arrivals is printed, no summary of the results obtained has yet been published.

The remarkable regularity in time of arrival of each species has emerged as the outstanding fact of the investigation. The results show that year after year the first bird of each species can be looked for around a median or average date. Occasionally odd birds appear much earlier than this due date, but seldom is the first bird late in the sense of being more than a day or two behind its average date. Similarly there is a period, varying from about a fortnight with the earliest species to a week with the later arrivals, when it can be said with reasonable certainty that a species will appear in numbers.

The weather in the Clyde Area appears to have little or no effect on the prompt arrival of the first representatives, nor indeed has the weather *en route* from their winter quarters, but weather to the south of the Area does have a marked effect on the arrival of the main body, and in a few years certain species have remained low in numbers until much later than usual. A perfect Spring is really unknown in Scotland. There are periods of inclement weather every year, and the most constant of such spells occurs each year in late April or early May. During these spells, birds tend to seek sheltered quarters rather than to take up breeding stations, but on the first fine day it will be seen that they are present in full numbers.

The average date of first arrival, being the median date worked out from the actual yearly records, tends in the case of a few species of rather local distribution to be on the late side. This reflects the fact that often there is no observer present at the right place at the right time. These species are the Chiffchaff, Wood Warbler and Grasshopper Warbler.

It is hoped that the following table, giving the concise results of so many years of work, will be of interest and of practical use to members of the *Glasgow and Andersonian Natural History and Microscopical Society* and also to other bird watchers in the West of Scotland.

# SUMMARY OF ARRIVAL DATES OF SUMMER BIRDS IN CLYDE AREA

Based on Records from 1893 to 1956

237

| BIRD                            | EARLIEST RECORDS OF ARRIVAL |                              | Average Date of First Arrival | Usual Dates for Majority of each Species |
|---------------------------------|-----------------------------|------------------------------|-------------------------------|--|
|                                 | Date                        | Locality                     |                               |  |
| Lesser Black-Backed Gull ... .. | January                     | Milngavie, Dunbartonshire    | March 6                       | March 15th to 31st                       |
|                                 | "                           | Helensburgh, Dunbartonshire  |                               |  |
|                                 | "                           | Helensburgh, Dunbartonshire  |                               |  |
| Wheatear ... ..                 | March                       | Hareshawmuir, Ayrshire       | March 24                      | April 1st to 15th                        |
|                                 | "                           | Stevenston, Ayrshire         |                               |  |
|                                 | "                           | Fannyside, Dunbartonshire    |                               |  |
| White Wagtail ... ..            | February                    | Largs, Ayrshire              | April 4                       | April                                    |
|                                 | March                       | Victoria Park, Glasgow       |                               |  |
|                                 | March                       | Whiting Bay, Arran           |                               |  |
| Chiffchaff ... ..               | February                    | Southend, Kintyre            | April 7                       | April 7th to 30th                        |
|                                 | March                       | Maidens, Ayrshire            |                               |  |
|                                 | "                           | Southend, Kintyre            |                               |  |
| Sand Martin ... ..              | March                       | Bardowie Loch, Stirlingshire | April 8                       | April 15th to 30th                       |
|                                 | "                           | Ailsa Craig, Ayrshire        |                               |  |
|                                 | "                           | Dalry, Ayrshire              |                               |  |
| Swallow ... ..                  | "                           | Southend, Kintyre            | April 10                      | April 15th to 30th                       |
|                                 | March                       | Lendalfoot, Ayrshire         |                               |  |
|                                 | April                       | Lendalfoot, Ayrshire         |                               |  |

SUMMARY OF ARRIVAL DATES OF SUMMER BIRDS IN CLYDE AREA—continued

238

| BIRD                 | EARLIEST RECORDS OF ARRIVAL |                            | Average Date of First Arrival | Usual Dates for Majority of each Species |
|----------------------|-----------------------------|----------------------------|-------------------------------|--|
|                      | Date                        | Locality                   |                               |  |
| Willow Warbler ...   | March                       | Ballantrae, Ayrshire       | April 12                      | April 15th to 25th                       |
|                      | "                           | Carmichael, Lanarkshire    |                               |  |
|                      | "                           | Carnwath, Lanarkshire      |                               |  |
| Common Sandpiper ... | April                       | Brodick, Arran             | April 13                      | April 18th to 28th                       |
|                      | "                           | Eaglesham, Renfrewshire    |                               |  |
|                      | "                           | Carluke, Lanarkshire       |                               |  |
| Yellow Wagtail ...   | March                       | Dalbeth, Lanarkshire       | April 21                      | May 1st to 8th                           |
|                      | April                       | Beith, Ayrshire            |                               |  |
|                      | "                           | Beith, Ayrshire            |                               |  |
|                      | "                           | Beith, Ayrshire            |                               |  |
|                      | "                           | Dalbeth, Lanarkshire       |                               |  |
| Cuckoo ...           | April                       | Mearns, Renfrewshire       | April 22                      | May 1st to 8th                           |
|                      | "                           | Milngavie, Dunbartonshire  |                               |  |
|                      | "                           | Lendalfoot, Ayrshire       |                               |  |
| Tree Pipit ...       | April                       | Carmichael, Lanarkshire    | April 23                      | May 1st to 8th                           |
|                      | "                           | Caldwell, Renfrewshire     |                               |  |
|                      | "                           | Craigends, Renfrewshire    |                               |  |
|                      | "                           | Darvel, Ayrshire           |                               |  |
| House Martin ...     | April                       | Lendalfoot, Ayrshire       | April 25                      | May 1st to 8th                           |
|                      | "                           | Hareshawmuir, Ayrshire     |                               |  |
|                      | "                           | Castlecary, Dunbartonshire |                               |  |
| Corncrake ...        | March                       | Maryhill, Glasgow          | April 25                      | May 1st to 8th                           |
|                      | April                       | Dippen, Arran              |                               |  |
|                      | "                           | Dippen, Arran              |                               |  |

| BIRD                             | EARLIEST RECORDS OF ARRIVAL  |  | Average Date of First Arrival | Usual Dates for Majority of each Species |
|----------------------------------|--|--|-------------------------------|--|
|                                  | Date   | Locality   |                               |  |
| Redstart ... ..                  | April 9 1893<br>" 13 1944<br>" 16 1905<br>" 16 1928<br>" 16 1955       | Giffnock, Renfrewshire<br>Richmond Park, Glasgow<br>Cadder, Lanarkshire<br>Johnstone, Renfrewshire<br>Endrick, Stirlingshire | April 26                      | May 1st to 8th                           |
| Whinchat ... ..                  | March 17 1931<br>April 4 1933<br>" 12 1950                             | Girvan, Ayrshire<br>Bute<br>Helensburgh, Dunbartonshire  | April 28                      | May 4th to 12th                          |
| Common Whitethroat               | April 14 1950<br>" 17 1951<br>" 18 1945                                | Largs, Ayrshire<br>West Kilbride, Ayrshire<br>Carluke, Lanarkshire   | May 1                         | May 5th to 13th                          |
| Wood Warbler ... ..              | April 13 1895<br>" 20 1908<br>" 21 1935                                | Ailsa Craig, Ayrshire<br>Dunoon, Argyllshire<br>Johnstone, Renfrewshire  | May 2                         | May 3rd to 10th                          |
| Sedge Warbler ... ..             | April 16 1945<br>" 22 1918<br>" 23 1893<br>" 23 1907<br>" 23 1944      | Southend, Kintyre<br>Summerston, Dunbartonshire<br>Mearns, Renfrewshire<br>Caldwell, Renfrewshire<br>Darvel, Ayrshire        | May 2                         | May 5th to 13th                          |
| Terns (Common and Arctic) ... .. | February 1 1912<br>" 4 1912<br>" 24 1912<br>April 11 1956<br>" 12 1952 | Davaar Lighthouse, Argyllshire<br>Cardross, Dunbartonshire<br>Dunure, Ayrshire<br>Ballantrae, Ayrshire                       | May 2                         | May 12th to 20th                         |



**SUMMARY OF ARRIVAL DATES OF SUMMER BIRDS IN CLYDE AREA—continued**

| BIRD                | EARLIEST RECORDS OF ARRIVAL |                            | Average Date of First Arrival | Usual Dates for Majority of each Species |
|---------------------|-----------------------------|----------------------------|-------------------------------|--|
|                     | Date                        | Locality                   |                               |  |
| Swift               | April                       | Kilbirnie Loch, Ayrshire   | May 2                         | May 10th to 17th                         |
|                     | "                           | Giffnock, Renfrewshire     |                               |  |
|                     | "                           | Beith, Ayrshire            |                               |  |
| Grasshopper Warbler | April                       | Howwood, Renfrewshire      | May 5                         | May 5th to 13th                          |
|                     | "                           | Beith, Ayrshire            |                               |  |
|                     | "                           | Lochwinnoch, Renfrewshire  |                               |  |
|                     | "                           | Drymen, Stirlingshire      |                               |  |
| Garden Warbler      | March                       | Bishopton, Renfrewshire    | May 8                         | May 10th to 20th                         |
|                     | April                       | Rouken Glen, Renfrewshire  |                               |  |
|                     | "                           | Loch Ard, Perthshire       |                               |  |
| Nighthjar           | April                       | Lamlash, Arran             | May 8                         | May 10th to 20th                         |
|                     | "                           | Lamlash, Arran             |                               |  |
|                     | "                           | Loch Fad, Bute             |                               |  |
| Blackcap            | April                       | Linn Park, Glasgow         | May 9                         | May 10th to 20th                         |
|                     | "                           | Cathcart, Glasgow          |                               |  |
|                     | "                           | Carlisle, Lanarkshire      |                               |  |
| Spotted Flycatcher  | April                       | Kildonan, Arran            | May 10                        | May 15th to 22nd                         |
|                     | "                           | Darnley Glen, Renfrewshire |                               |  |
|                     | May                         | Darvel, Ayrshire           |                               |  |
|                     | "                           | Torrance, Stirlingshire    |                               |  |

## A NOTE ON *PLUMATELLA* AND *ANCYLUS* IN A MOUNTAIN LOCHAN

By W. RUSSELL HUNTER and MYRA RUSSELL HUNTER

(MS. received 17th September, 1956)

On 18th July, 1955, Loch Coire Uaigneich in the Blaven group of the Black Cuillin, Strathaird, Isle of Skye was visited. This lochan lies in an exposed position at 1,450 feet on a shoulder running eastward from the south peak of Blaven (3,031') towards the subsidiary hill, An Stac. Covering the stony shores were extensive branching colonies of a freshwater bryozoan. Several pieces were collected, along with a sample (15 specimens) of the freshwater limpet *Ancylus fluviatilis* Müller which was also very numerous. The species of bryozoan was subsequently determined and proved to be *Plumatella polymorpha* Kraepelin, different colonies approaching var. *fungosa* and var. *coralloides*. It is most satisfactory to follow Ward and Whipple (1918, and later editions) in using Kraepelin's revised classification, thus regarding as in'raspecific the many forms which Allman (1856) and more recent British authors erect into species. Characteristic statoblasts were being produced in the colonies collected. These consist of lens-shaped masses of cells encased in chitinous capsules and, when the bryozoan colony dies off in the winter, they survive to germinate and give rise to new colonies in the spring. Bryozoans are peculiarly well suited to life in mountain lochs, wherein rapid—almost vegetative—growth is possible exploiting the short summer season, while internal dormant buds (the statoblasts) are produced to survive quiescent through the winter period.<sup>a</sup> That this feature of animals in mountain lakes—a suspension of reproduction, growth and all active life during the winter—is applicable to Loch Coire Uaigneich, was borne out by the condition of the population of the limpet *Ancylus*. On 18th July, the breeding season appeared to be not long advanced, many limpets were still copulating, and egg-capsules, though numerous, contained only early embryos. In most lowland populations such a condition is reached before mid-May (Hunter, 1953); that is, the breeding season of the limpet in Loch Coire Uaigneich is about nine weeks later than in freshwaters at about 350' in the Midland Valley of Scotland or near sea level in Skye itself. The size of the breeding adults was relatively small. The limpets from Loch Coire Uaigneich had shell lengths ranging from 3.9 to 4.9 mm. (mean length=4.52 mm., s.d.=0.29 mm.). This can be compared to a sample of breeding adults in a

typical year (see Hunter, 1953) from the Craigton Burn, 365' above sea level, near Glasgow, where shell lengths ranged from 4.5 to 8.0 mm. (mean length=6.07 mm., s.d.=0.70 mm., 80 specimens). In summary, in the habitat provided by Loch Coire Uaigneich, the adverse climatic conditions in winter had both delayed the onset of the breeding season and reduced by 26% the growth of maturing limpets. Both *Plumatella* and *Ancylus* are tolerant of, and can be abundant in, very soft fresh waters and, unlike certain land snails discussed by the present writers elsewhere (Hunter and Hunter, 1956), increase in latitude or in altitude (i.e. increasingly adverse climate) does *not* appear to raise the minimum calcium requirements in these genera. Finally, both organisms have a similar significance in the list of animals living in the fresh waters of the world. The greater part of freshwater faunas (if insects are discounted) are made up of a surprisingly limited number of families and genera, each of cosmopolitan or near-cosmopolitan distribution, yet with a very high degree of local differentiation at specific or infraspecific levels. The ancylid limpets and the plumatellid bryozoa form two groups very characteristic of this limited list.

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## NOTES ON THE HYDROMEDUSAE OF THE CLYDE SEA AREA WITH NEW DISTRIBUTION RECORDS

By M. VANNUCCI, Ph.D.\*, Oceanographic Institute, Sao Paulo  
and the Marine Station, Millport ;

communicated by Professor C. M. YONGE, C.B.E., F.R.S.

(MS received 29th August, 1956)

The hydromedusae in the Firth of Clyde were first reported on by E. T. Browne in 1905. Since then a few additional forms have been recorded by Rees (1940-41). During a short visit to Millport in April - May, 1956, a number of plankton hauls were made and the hydromedusae were collected. Out of a total of 25 species, three were found to be new to the Clyde sea area and it is, therefore, worth recording their presence and relating it to their general distribution.

In his monograph, Russell (1953) lists 30 families including 91 different species which have been, or probably will be, recorded from around the British Isles. Of these he gives 29 species, grouped in 15 families which have been recorded from the Clyde area, and says that six others (one belonging to an additional family) are probably yet to be found there. The following six species recorded by Rees (1940-41) must also be added to the list: *Bougainvillia principis*, *B. superciliaris*, ? *Neoturris pileata*, *Sarsia prolifera*, *Stauridiosarsia producta*, *Lovenella clausa*. All these were taken at Millport during 1940. This brings the number of medusae known to have been taken at Millport, to a total of 35 species. Of the 35 species known to occur in the Clyde area, 22 were collected between April 16th and May 17th, 1956.

Table I gives a list of the species found at this time, with their relative abundance and date they were first collected. New records are marked with an asterisk. The dates with the species name indicate when first recorded in the Clyde. The tow nettings were taken with open nets of bolting silk of 50 or 26 meshes to the inch, occasionally with finer meshed nets or a 1 m. stramin net. The depth of towing varied from the surface to 180 m. Most of the hauls were made during the day, a few shortly after dusk between 9 and 10 p.m., one at 1.30 a.m. at Keppel Pier and three between 4.30 and 5 a.m. They were usually taken off Keppel Pier or near Garroch

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Head, but occasionally from more open waters or in Loch Fyne.

The distribution records, seasonal occurrence and data of abundance included in Table I are taken from Russell (1953, pp. 27, 30). The abbreviations are as follows: B—boreal; NB—northern boreal; SB—southern boreal; C—cosmopolitan; NE—north eastern area; E—eastern; NW—north western; W—western; IS—Irish Sea; S—southern; SW—south western; S<sub>(W)</sub>—western portion of the English Channel, S<sub>(E)</sub>—eastern portion of the Channel; SE—south eastern region.

*Sarsia eximia* had previously been recorded only once in this area by Browne (1905, p. 756) who found in 1901 a healthy colony on the piles of Keppel Pier and reared the medusae in the laboratory. It is not recorded by Rees in 1940-41, who records instead *Stauridiosarsia producta*, a very similar species and never before or after to my knowledge recorded from the plankton. The medusae of *Sarsia eximia* have a short life and reach maturity in seven to ten days in September and are, therefore, not likely to be abundant. *Cosmetira pilosella* was previously recorded only once by Rees (1941) who reared it from the hydroid and collected an immature specimen at Keppel Pier in April. *Staurophora mertensi* was also recorded only once by Gauld (1952), who reported it as common from May to July 1951. The absence of *Leuckartiara octona* is remarkable since it was known to be fairly common and still was so in 1940. It could be found all the year round but was more abundant later in the season. Equally astonishing is the apparent absence of *Phialella quadrata* a species very abundant in 1940 during the same time of the year.

Browne's paper (1905) records the relative abundance and seasonal occurrence of the medusae of the Firth of Clyde in 1901, which, however, was a poor year for medusae. His results in April-May, 1901, were as follows:—

|                                |     |     |               |
|--------------------------------|-----|-----|---------------|
| <i>Hybocodon prolifer</i>      | ... | ... | very abundant |
| <i>Rathkea octopunctata</i>    | ... | ... | 16            |
| <i>Obelia</i> ...              | ... | ... | scarce        |
| <i>Phialidium</i> ...          | ... | ... | very scarce   |
| <i>Podocoryne borealis</i>     | ... | ... | 11            |
| <i>Euphysa aurata</i> ...      | ... | ... | 3             |
| <i>Zanclaea costata</i> ...    | ... | ... | 2             |
| <i>Bougainvillia</i> (juv.)    | ... | ... | 1             |
| <i>Sarsia</i> (juv.) ...       | ... | ... | 1             |
| <i>Melicertum octocostatum</i> | ... | ... | 1             |
| <i>Steenstrupia nutans</i> ... | ... | ... | 1             |

The relative abundance of these species is similar to what was now found except for the scarcity of *Obelia* and *Phialidium*

and the greater abundance of *Hybocodon* compared with *Podocoryne*, but none of the oceanic or Atlantic waters indicator species is recorded.

In order of decreasing abundance, Rees' results (1940-41) may be thus summarized\* :—

|                                    |        |               |
|------------------------------------|--------|---------------|
| <i>Phialidium hemisphaericum</i>   | ...    | very abundant |
| <i>Phialella quadrata</i>          | ... .. | abundant      |
| <i>Obelia</i> ... ..               | ...    | common        |
| <i>Podocoryne borealis</i>         | ... .. | 53            |
| <i>Melicerium octocostatum</i>     | ... .. | 41            |
| <i>Sarsia tubulosa</i> ... ..      | ...    | 25            |
| <i>Tiaropsis multicirrata</i>      | ... .. | 25            |
| <i>Rathkea octopunctata</i>        | ... .. | several       |
| <i>Bougainvillia ramosa</i>        | ... .. | 4             |
| <i>Proboscoidactyla stellata</i>   | ... .. | 4             |
| <i>Leuckartiara octona</i>         | ... .. | 3             |
| <i>Bougainvillia principis</i>     | ... .. | 3             |
| <i>Cosmetira pilosella</i>         | ... .. | 2             |
| <i>Zanclus costata</i> ... ..      | ...    | 2             |
| <i>Podocoryne carnea</i>           | ... .. | 2             |
| <i>Euphysa aurata</i> ... ..       | ...    | 2             |
| <i>Sarsia prolifera</i> ... ..     | ...    | 1             |
| <i>Bougainvillia superciliaris</i> | ... .. | 1             |

Compared to Rees' results in April-May, 1940, the present findings show a much greater abundance of *Obelia*, *Rathkea octopunctata*, *Neoturris pileata*, *Hybocodon prolifer* and *Euphysa aurata* as well as a greater number of indicators of Atlantic waters.

From the lists of Browne, Marshall (1925), and Rees, and from the present results, it may safely be stated that the medusan fauna of the Clyde area consists predominantly of northern boreal species. In 1940, however, *Cosmetira pilosella* was found breeding in the area for the first time and only a single *Neoturris pileata* was found by Rees (1940-41); at the same time *Bougainvillia ramosa* and *B. principis* were first recorded from the area; *Staurophora mertensi*, a conspicuous species, was first recorded by Gauld in 1952. All of these were found to be present in 1956, with the difference, however, that *Bougainvillia principis* was abundant and *Neoturris pileata* was one of the commonest species. Of the 1956 new records, one is an oceanic species and another an indicator of Atlantic waters.

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\* Dr. Rees informs me that the specimens recorded as *Podocoryne* sp. were *P. borealis*, with atrophied gonads; he also informs me that *Halitholus pauper* proved to be an abnormal *L. octona*.

## DISCUSSION

Although it is fully realized that these brief observations cannot be considered as final, a few comments may be made on the present findings. More detailed observations during a longer period of time over the whole area and with comparative methods and regular countings are highly desirable since there may have been here, as well as off Plymouth, a considerable change in the plankton during the past years (personal communications from S. M. Marshall and F. S. Russell). The present data tend to confirm this assumption.

The medusan fauna of the Clyde area is, as would be expected, predominantly littoral and the finding of such species as *Leuckartiara brevicornis*, *Neoturris pileata*, *Cosmetira pilosella* and *Laodicea undulata* suggests that there is an increasing influence of oceanic Atlantic waters in this area.

*Staurophora mertensi* has been found quite abundantly over a long period in recent years. The presence of the breeding *Cosmetira pilosella* hydroid colonies, the presence of abundant very young *Neoturris pileata* as well as fairly young *Laodicea undulata* suggest that these have been breeding in the area, and all indicate that these species, two of which are considered as very good indicators of Atlantic waters, have become regular inhabitants of the Clyde area.

Although there appears to be an influx of oceanic species, the usual neritic species are still present.

Linked to the presence of the above mentioned species, considered as indicators of *Sagitta elegans* waters, is the relatively high abundance of *Bougainvillia principis* and *Euphysa aurata*. Opposed to it is the presence of *Sarsia tubulosa* and the unexpected presence of *Eutonina indicans*. This suggests a certain degree of mixture, perhaps due to the influence of the river Clyde. *Eutonina indicans* is a northern boreal species so far known only from the NE and E areas. Its distribution around the British Isles is approximately the same as that of *Staurophora mertensi* recently found in the Clyde area; both species are at present probably breeding in the area. *E. indicans* is also known in the Skager Rak and in Norwegian fjords; it is, therefore, probably a species tolerating low salinity. In the present collection only two specimens in poor condition were found.

## ACKNOWLEDGMENTS

I am grateful to Drs. S. M. Marshall and W. J. Rees for the revision of the manuscript and much helpful criticism and to the latter for having put at my disposal his records and collections taken at Millport in 1940. I also wish to express my thanks to the staff of the Marine Station at Millport, for all the facilities afforded me.



## SUMMARY

A total of 26 different species of medusae were collected in the Clyde Area, between the 16th of April and the 17th of May, 1956. The three following species were recorded for the first time in this area: *Laodicea undulata*, *Leuckartiara brevisconis*, *Eutonina indicans*.

The relative abundance of the species collected during April-May, 1956, as compared with the records of Browne (1905), Marshall (1925) and Rees (1940/41) suggests that there has been a growing influx of Atlantic water in the Clyde area and that a number of these species are breeding there. The number of specimens and of species of coastal forms has remained as abundant as before.

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TABLE I

| SPECIES                                    | Number<br>in April and<br>May 1956 | First<br>appearance<br>1956 | Ecological<br>Distribution | Habitat<br>(Russell) | Abundance<br>(Russell) | Geographic Distribution<br>(British Isles) |
|--|------------------------------------|-----------------------------|----------------------------|----------------------|------------------------|--|
| <i>Obelia</i> —prob. 2 species             | very<br>abundant                   | 16-4                        | C                          | neritic              | abundant               | all areas                                  |
| <i>Rathkea octopunctata</i> ...            | very<br>abundant                   | 16-4                        | NB                         | neritic              | abundant               | all areas                                  |
| <i>Phialidium hemisphericum</i> ...        | very<br>abundant                   | 16-4                        | B                          | neritic              | not<br>numerous        | all areas                                  |
| <i>Podocoryne borealis</i> ...             | 58                                 | 25-4                        | ?NB                        | neritic              | not<br>numerous        | all except NE-S(E) -SE                     |
| <i>Sarsia tubulosa</i> ...                 | 27                                 | 21-4                        | NB                         | coastal low sal.     |                        | all areas                                  |
| <i>Bougainvillia principis</i> (1940—Rees) | 26                                 | 30-4                        | NB                         | coastal              |                        | known from NE-<br>NW-IS-SW-S(W)            |
| <i>Melicerturn octocostatum</i> ...        | 25                                 | 25-4                        | ?NB                        | neritic              | rather<br>common       | all except S(E) -SE                        |
| <i>Euphysa aurata</i> ...                  | 22                                 | 30-4                        | NB                         | neritic              | common                 | all except S(E) -SE                        |
| <i>Hybocodon prolifer</i> ...              | 21                                 | 23-4                        | NB                         | neritic              | may be<br>abundant     | all areas                                  |
| <i>Neoturris pileata</i> (1940—Rees) ...   | 18                                 | 23-4                        | SB                         | oceanic              |                        | NE-E-IS-SW                                 |
| <i>Bougainvillia britannica</i> ...        | 13                                 | 7-5                         | B                          | neritic              |                        | all, except S(E)                           |
| <i>Mitrocomella polydiademata</i> ...      | 12                                 | 24-4                        | ?NB                        | neritic              | may be<br>abundant     | all except SW-<br>S(s)-S(E)-SE             |
| <i>Tiaropsis multicirrata</i> ...          | 9                                  | 24-4                        | NB                         | neritic              | may be<br>abundant     | present in NE-E-<br>NW-W-IS                |

TABLE I—continued

| SPECIES                                  | Number<br>in April and<br>May 1956 | First<br>appearance<br>1956 | Ecological<br>Distribution | Habitat<br>(Russell)                         | Abundance<br>(Russell)  | Geographic Distribution<br>(British Isles) |
|--|------------------------------------|-----------------------------|----------------------------|--|-------------------------|--|
| <i>Bougainvillia ramosa</i> (1940—Rees)  | 6                                  | 30-4                        | SB                         | coastal                                      | not<br>common           | E-IS-SW                                    |
| * <i>Laodicea undulata</i> —1956 ...     | 6                                  |                             | S                          | coastal where<br>bathed in Atlantic<br>water |                         |  |
| <i>Staurophora mertensi</i> (1951—Gauld) | 4                                  | 11-5                        | NB                         |  | abundant                | only known NE                              |
| * <i>Leuckartiara brevisconis</i> —1956  | 3                                  | 11-5                        |                            | oceanic                                      |                         |  |
| <i>Lizzia blondina</i> ...               | 3                                  | 7-5                         | SB                         | neritic                                      | abundant                | all except S(E)                            |
| <i>Sarsia gemmifera</i> ...              | 3                                  | 7-5                         | SB                         | neritic                                      | not<br>abundant         | all except NE-IS<br>NE-E                   |
| * <i>Eutonina indicans</i> —1956 ...     | 2                                  | 11-5                        | NB                         |  |                         |  |
| <i>Podocoryne carnea</i> ...             | 2                                  | 7-5                         | C                          | neritic                                      | uncommon                | all except E-NW-S(E)                       |
| <i>Cosmetira pilosella</i> ...           | 2                                  | 3-5                         | SB                         | usually assoc.<br>Atlantic water             | may be<br>numerous      | all except NW-W-SE                         |
| <i>Steenstrupia nutans</i> ...           | 1                                  | 14-5                        | NB                         | neritic                                      | may be very<br>abundant | all areas                                  |
| <i>Dipleurosoma typicum</i> ...          | 1                                  | 25-4                        | ?                          | neritic                                      | usually rare            | only in W and SW areas                     |
| <i>Sarsia eximia</i> ...                 | 1                                  | 26-4                        | ?NB                        | coastal                                      | scarce                  | all areas                                  |

# A KEY TO THE BRITISH SPECIES OF THE GENUS *CYCLOPS* O. F. MULLER

By F. E. SLACK, Dept. of Zoology, University of Glasgow  
(MS. received 28th July, 1956)

Naturalists interested in freshwater faunas have tended to neglect the genus *Cyclops*—although species are widespread and abundant in all kinds of freshwater—largely on account of difficulty in specific identification. However, a member of this Society, Thomas Scott, F.L.S., published in 1901 a list of seventeen species for the Clyde Area, including nine from Loch Lomond. Since that time Gurney (1931-33) has written a monograph on British freshwater Copepods, those of the American fauna having already been described by Ward & Whipple (1918). This key has been compiled from Gurney's monograph with reference to Ward & Whipple to facilitate identification of species of *Cyclops* and to stimulate an interest in them among amateur naturalists. Before publication, the key has been used in MS. by workers at Glasgow University Field Station, Rossdhu, Loch Lomond.

Certain of the species described by Gurney have not been found in Britain or have doubtful rank as species and have been omitted. The following species have been included :—

- Halicyclops aequordus*, Fischer, 1860.
- Cyclops fusca*, Jurine, 1820.
- C. albidus*, Jurine, 1820.
- C. distinctus*, Richard, 1887.
- C. praesinus*, Fischer, 1860.
- C. agilis*, s. str., Koch, 1838.
- C. agilis speratus*, Lilljeborg, 1901.
- C. macruroides*, s. str., Lilljeborg, 1901.
- C. macruroides, denticulatus*, Graeter, 1903.
- C. macrurus*, Sars, 1863.
- C. fimbriatus*, s. str., Fischer, 1853.
- C. fimbriatus, poppei*, Rehberg, 1880.
- C. affinis*, Sars, 1863.
- C. phaleratus*, Koch, 1838.
- C. strenuus*, s. str., Fischer, 1851.
- C. strenuus, abyssorum*, Sars, 1863.
- C. strenuus, tatricus*, Kozminski, 1932.
- C. scutifer*, Sars, 1863.
- C. furcifer*, Claus, 1857.
- C. vicinis*, Ujanin, 1875.
- C. viridis*, Jurine, 1820.
- C. gigas*, s. str., Claus, 1857.
- C. gigas, latipes*, Lowndes, 1927.

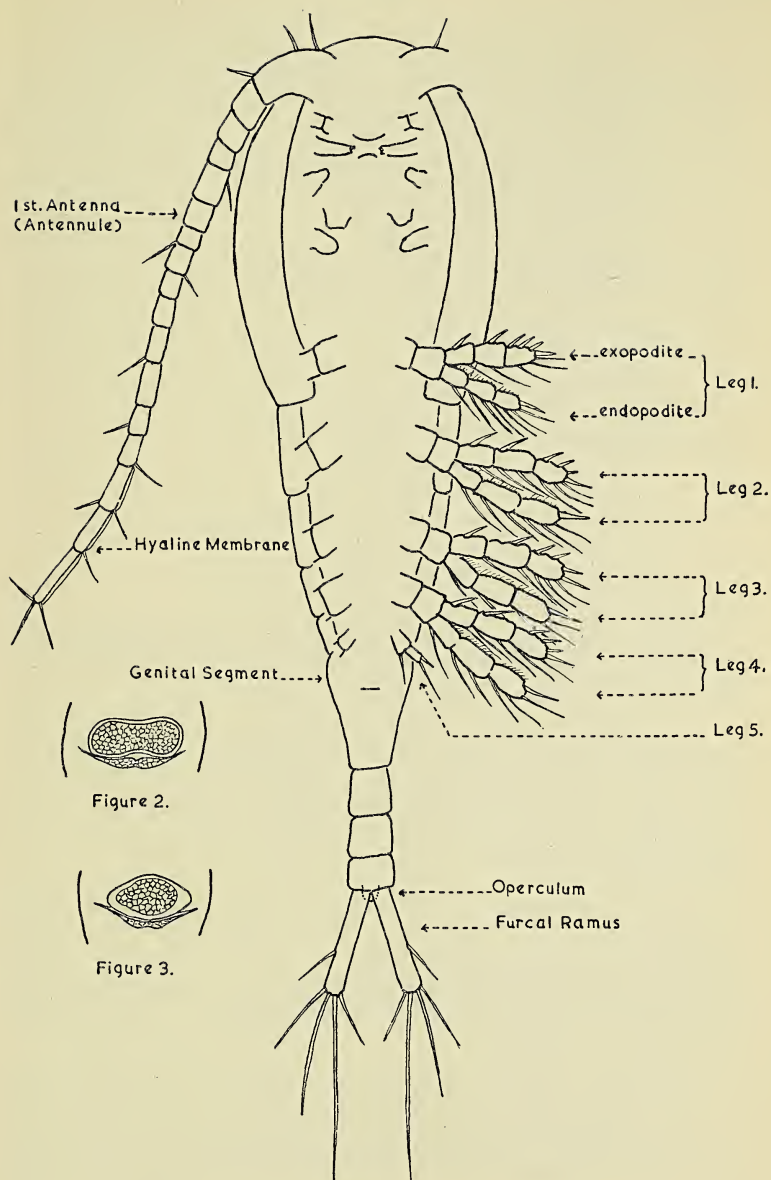


Figure 1.

Fig. 1 Generalized diagram of *Cyclops*Fig. 2 Receptaculum of *C. vernalis*Fig. 3 Receptaculum of *C. vernalis americanum*





## II. Leg 5 unsegmented

- a. Leg 5 obsolete, 3 spines or setae directly from thoracic somite 5 . . . sub. gen. *Ectocyclops* (GIII p.137)  
*C. phaleratus* (G III p. 137 W & W p. 779)

- b. Leg 5 a small plate with an inner spine and 2 outer setae

1. Antennule segments 11 or less sub. gen. . . . .  
*Paracyclops* (G III p. 120)

- a\* Antennule of 8 segments (*C. fimbriatus*) . . . b\*  
 Antennule of 11 segments . . . *C. affinis* (G III p. 130)

- b\* Furcal rami 4-6 times as long as wide with short transverse row of spinules by lateral seta . . .  
*C. fimbriatus* s.str. (G III p. 121 W & W p. 780)  
 Rami 3-4 times as long as wide with longitudinal dorsal row of spinules . . . *C. fimbriatus poppei* (G III p. 129)

2. Antennule segments 12 with hyaline membrane or spinules on segment 12

- a\* Furcal rami long and slender with denticles on outer margin . . sub. gen. *Eucyclops* (G III p. 97)

- a Antennule segment 12 membrane in proximal half, smooth or minutely serrated . . . b  
 Antennule segment 12 membrane in proximal half, distinctly broken into teeth  
 (*C. macruroides*) . . . . . d

- b Antennule segments 10-12 very long and slender; rami of female with saw-like row of denticles (*C. agilis*) . . . . . c  
 These segments not very slender; rami very long with obliquely arranged group of spinules distally . . . *C. macrurus* (GIII p. 115)

- c Rami generally not more than 5 times as long as wide, lateral "saw" conspicuous . . .  
*C. agilis* s.str. (G III p. 99)

- [equals *C. serrulatus* (W & W p. 779)]  
 Rami generally more than 5 times as long as wide; lateral denticles very small . . .  
*C. a. speratus* (G III p. 104)

- d Membrane of proximal half of antennule segment 12 with many finely pointed teeth . .  
*C. macruroides* s.str. (G III p. 109)

- This membrane with 10-12 large blunt teeth  
*C. m. denticulatus* (G III p. 111)

- b\* Furcal rami short, without outer spinules; receptaculum of peculiar form . . . . .  
 sub. gen. *Tropocyclops* (G III p. 86)  
*C. prasinus* (G III p. 87 W & W p. 779)

C. *Cyclops* gp. *Bifida*

- I. Antennule with hyaline membrane; leg 5 normally 2 segmented, segment 2 with long apical setae. Receptaculum hammer-shaped . . . . . sub. gen. *Mesocyclops* (G III p. 286)
  - a\* Leg 1, basis without inner seta, antennule segment 17 membrane toothed . . *C. leukarti* (G III p. 287 W & W p. 777)
  - b\* Leg 1, basis with inner seta, antennule membrane without teeth
    1. Inner furcal seta more than twice as long as outer
      - a Inner apical spine of leg 4 endopodite 3 much longer than endopodite 3 . . . *C. oithonoides* (G III p. 300)
      - b Inner apical spine of leg 4 endopodite 3 shorter than endopodite 3 . . . *C. hyalinus* (G III p. 295)
    2. Inner furcal seta not much longer than outer . . . *C. dybowskii* (G III p. 302)
- II. Antennule segment 17 with row of spinules; exopodite 3, legs 1-4 with 5 setae; leg 5 segment 2 with large inner spine in middle of segment; furcal rami with dorsal ridge . . . . . *Cyclops* s.str. (G III p. 147)
  - a\* Thoracic somites 4 and 5 expanded and pointed
    1. Leg formula 2. 3. 3. 3. . . *C. vicinis* (G III p. 175)
    2. Leg formula 3. 4. 3. 3. . . . *c. scutifer* (G III p. 169)
  - b\* Thoracic somites not expanded
    1. Furcal rami 8 x as long as wide. Inner and outer apical setae nearly equal . . *C. furcifer* (G III p. 170)
    2. Furcal rami rarely 8 x as long as wide. Inner apical setae nearly 2 x as long as outer . . . *C. strenuus*
      - a Leg 4 endopod 3 less than 3 x as long as wide; furcal seta 4 usually shorter than ramus . . . *C. strenuus* s.str. (G. III p. 153)
      - Leg 4 endopod 3, 3 x as long as wide. Furcal seta 4 longer than ramus . . . . . b
      - b Somite of leg 2 produced backwards on either side as a rounded lobe . . *C. s. tatricus* (G III p. 151)
      - This somite not so produced . . . *C. s. abyssorum* (G III p. 160)
- III. Antennule without spinules; exopodite 3 with 4 setae; leg 5, segment 2, inner spine near apex; furcal rami without dorsal ridge . . . . . *Acanthocyclops* (G III p. 182)
  - a\* Antennule of 17 segments
    1. Leg 5, segment 2, inner spine small, in middle of segment; inner margin of rami hairy.
      - a. Inner furcal seta more than twice as long as outer *C. viridis* (G III p. 185 W & W p. 775)
      - Inner furcal seta slightly longer than outer . . . *C. gigas* (G III p. 191)
    - (1) Leg 4 endopodite 3 more than  $2\frac{1}{2}$  x as long as wide *C. gigas* s.str. (G III p. 191)
    - (2) This segment rarely more than 2 x as long as wide *C. gigas latipes* (G III p. 195)

2. Leg 5, segment 2, inner spine nearly apical; rami not hairy
    - a. Receptaculum butterfly-shaped; exopodite 1, segments 1-4 without inner seta . . *C. sensitivus* (G III p. 215)
    - b. Receptaculum not butterfly-shaped; exopodites inner seta
  - (1) Inner furcal seta shorter than outer; inner apical spine of endopodite of leg 4 longer than outer . . . *C. bisetosus* (G III p. 227)
  - (2) Inner furcal seta longer than outer; inner apical spine of endopodite of leg 4 shorter than outer; inner spine leg 5 long; posterior part of receptaculum large . . . *C. bicuspidatus* (G III p. 219 W & W p. 776)
  - (3) Leg 5, inner spine very small; posterior part of receptaculum very narrow . . . *C. vernalis* (G. III p. 198)
    - (a) Receptaculum as in Fig. 2 . . *C. vernalis* s.str. (G III p. 198)
    - (b) Receptaculum as in Fig. 3 . . . *C. vernalis americanum* (G III p. 205)  
[equals *C. viridis* (W & W p. 775)]
  - b\* Female antennule of 16 segments . . . *C. languidus* (G III p. 236)
  - c\* Female antennule of 14 segments . . . *C. bicuspidatus lubbocki* (G III p. 222)
  - d\* Female antennule of 12 segments
    1. Furcal rami with inner side hairy; exopodite 3 of leg 4 with 5 inner setae . . . *C. venustus* (G III p. 210)
    2. Furcal rami not hairy; exopodite 3 of leg 4 with 4 inner setae . . . *C. crassicaudis* (G III p. 232)
  - e\* Female antennule of 11 segments
    1. Lateral seta of furcal ramus in middle . . *C. nanus* (G III p. 248)
    2. Lateral seta of furcal ramus near end of ramus . . *C. languidoides* (G III p. 241)
  - f\* Antennule of 10 segments . . *C. abyssicola* (G III p. 235)
- IV. Antennule of less than 17 segments; rami of legs 2-segmented; leg<sub>5</sub> of one segment or vestigial . . . *Microcyclops* (G III p. 251)
- a\* Leg 5 obsolete; 3 setae on margin of thoracic somite 5  
*C. demetiensis* (G III p. 281)
  - b\* Leg 5 segment 2 distinct
    1. Operculum large and triangular; leg 5 seta of segment 1 absent . . *C. unisetiger* (G III p. 278)



2. Operculum not large; seta of segment 1 leg 5 arising from thoracic somite

*a* Leg 1 base without inner seta; endopodite 2 of leg 4 with one apical spine . . . *C. minutus*  
(G III p. 266)

*b* Leg 1 base with seta; endopodite 2 of leg 4 with 2 spines

- (1) Leg 5 segment 2 inner spine apical; receptaculum hammer-shaped . . . . . *C. gracilis* (G III p. 272)

- (2) Leg 5 segment 2 inner spine in middle or absent; receptaculum not hammer-shaped

(a) Leg 4 endopodite outer apical spine more than half the length of the inner spine . . .  
*C. varicans* (G III p. 255  
W & W p. 779)

(b) Ditto less than one third length of inner spine  
*C. bicolor* (G III p. 262)  
W & W p. 780

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- (1) "The Plants of Possil Marsh."
- (2) "Endemicism in the snails of Jamaica."
- (3) "Climatological and salinity data for Millport, Scotland."

# LIST OF FIRST ARRIVALS OF SUMMER BIRDS IN CLYDE AREA IN 1955. COMPILED FROM REPORTS OF MEMBERS AND FRIENDS

BY THOMAS ROBERTSON

| <i>Bird</i>                          | <i>Date</i>                              | <i>Locality</i>  | <i>Average<br/>Date<br/>over 61<br/>years</i> | <i>Earliest<br/>Date, 1954</i> |
|--------------------------------------|--|--|---|--------------------------------|
| <b>Lesser Black-<br/>Backed Gull</b> | Jan. 1<br>Feb. 28                        | Milngavie<br>Richmond Park, Glasgow                      | Mar. 6  | Feb. 24                        |
| <b>Chiffchaff</b>                    | Mar. 27<br>April 1<br>April 6            | Maybole<br>Southend, Kintyre<br>Millport                 | April 7                                       | Mar. 28                        |
| <b>Wheatear</b>                      | Mar. 28<br>Mar. 28<br>April 1            | Loch Doon<br>Southend, Kintyre<br>Ben Bhreac             | Mar. 24                                       | Mar. 24                        |
| <b>White Wagtail</b>                 | April 4                                  | Richmond Park, Glasgow                                   | April 4                                       | April 27                       |
| <b>Swallow</b>                       | April 5<br>April 6<br>April 8<br>April 8 | Southend, Kintyre<br>Millport<br>Drymen<br>Garrionbridge | April 10                                      | Mar. 28                        |
| <b>Sand Martin</b>                   | April 6<br>April 8<br>April 10           | Hamilton<br>Garrionbridge<br>Dalry                       | April 8                                       | Mar. 30                        |
| <b>Willow<br/>Warbler</b>            | April 6<br>April 12<br>April 15          | Millport<br>Maybole<br>Bute                              | April 12                                      | April 16                       |
| <b>House Martin</b>                  | April 8<br>April 26<br>April 30          | Largs<br>Dalry<br>Maybole                                | April 25                                      | May 1                          |
| <b>Common<br/>Sandpiper</b>          | April 10<br>April 20<br>April 23         | Rosebank, Carluke<br>Tarholm, Annbank<br>Bute            | April 13                                      | April 18                       |
| <b>Redstart</b>                      | April 16<br>April 17<br>April 24         | Endrick<br>Loch Katrine<br>Loch Ard                      | April 26                                      | May 8                          |
| <b>Cuckoo</b>                        | April 17<br>April 18<br>April 20         | Gualann Hill, Loch Lomond<br>Tairlow, Straiton<br>Bute   | April 22                                      | April 17                       |
| <b>Terns (Common<br/>and Arctic)</b> | April 22                                 | Southend, Kintyre  | May 2   | May 6                          |

| <i>Bird</i>                    | <i>Date</i>                         | <i>Locality</i>  | <i>Average<br/>Date<br/>over 61<br/>years</i> | <i>Earliest<br/>Date, 1954</i> |
|--------------------------------|-------------------------------------|--|---|--------------------------------|
| <b>Whinchat</b>                | April 23<br>April 24                | Tairlaw, Straiton<br>Loch Ard                                    | April 28                                      | April 25                       |
| <b>Corncrake</b>               | April 24<br>May 2<br>May 4          | Dalry<br>Maybole<br>Southend, Kintyre                            | April 25                                      | May 1                          |
| <b>Tree Pipit</b>              | April 24<br>May 7                   | Loch Ard<br>Southend, Kintyre                                    | April 23                                      | April 24                       |
| <b>Grasshopper<br/>Warbler</b> | April 27                            | Kinlochard   | May 5   | May 8                          |
| <b>Swift</b>                   | April 29<br>May 5<br>May 5          | Newlands, Glasgow<br>Dalry<br>Shawlands, Glasgow                 | May 2   | May 7                          |
| <b>Common<br/>Whitethroat</b>  | April 30<br>May 2<br>May 3<br>May 3 | Clarkston, Renfrewshire<br>Southend, Kintyre<br>Dalry<br>Maybole | May 1   | May 7                          |
| <b>Wood Warbler</b>            | April 30<br>May 3                   | Loch Ard<br>Maybole  | May 2   | May 8                          |
| <b>Garden<br/>Warbler</b>      | April 30<br>May 7<br>May 10         | Loch Ard<br>Drymen<br>Maybole                                    | May 8   | May 9                          |
| <b>Sedge<br/>Warbler</b>       | May 1<br>May 4<br>May 5             | Bute<br>Southend, Kintyre<br>Dalry                               | May 2   | May 8                          |
| <b>Yellow<br/>Wagtail</b>      | May 6                               | Oatlands   | April 21                                      | April 27                       |
| <b>Spotted<br/>Flycatcher</b>  | May 12<br>May 12<br>May 15          | Maybole<br>Richmond Park, Glasgow<br>Rothesay                    | May 10  | May 10                         |
| <b>Blackcap</b>                | May 26                              | Maybole  | May 9   | —                              |
| <b>Ring Ousel</b>              | Mar. 31<br>April 3<br>April 7       | Ben Bhreac<br>Stronachlachar<br>Aberfoyle                        | —   | —                              |
| <b>Turtle Dove</b>             | June 3                              | Southend, Kintyre  | —   | —                              |

## SESSION XXV—1955

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## NOTES FROM EXCURSION AND SECTIONAL REPORTS

(1955)

*(Full reports may be consulted at the Library)***Botanical Section.**

Reports were made on 10 excursions, which continued to attract a reasonable number of members, the average attendance being about eleven.

Mr. Richard Prasher's reports on the six special botanical excursions include the following notes on observed species:—*Paris quadrifolia* L., *Ranunculus auricomus* L., and *Carex flacca* Schreb. in Fiddler's Gill, Braidwood; *Oxycochus palustris* Bers. (recorded by Mr. A. Stirling) near Milngavie; *Hippuris vulgaris* L. and *Schoenoplectus lacustris* (L.) Palla (both reduced in numbers), and, in increasing quantity, *Carex disticha* Huds., in Possil Marsh; *Sedum villosum* L. and *Leontodon hispidus* L. near Blackwood; *Scleranthus annuus* L., *Ornithopus perpusillus* L., *Conium maculatum* L., *Aethusa cynapium* L., *Senecio sylvaticus* L., *Jasione montana* L., *Echium vulgare* L. and *Solanum nigrum* L. near Irvine.

Mr. Prasher also reported on an alpine excursion, arranged with the Botany Department of the University, to Creag-an-Lochain. Under the joint leadership of Mr. R. Mackechnie, Mr. B. Ribbons and Dr. D. Patton, many plants characteristic of the lower alpine region were noted, including *Draba incana* L., *Cochlearia alpina* Wats., *Silene acaulis* L., *Cerastium alpinum* L., *Oxyria digyna* (L.) Hill, *Sibbaldia procumbens* L., *Saxifraga oppositifolia* L., *Polygonum viviparum* L. and *Luzula spicata* (L.) DC.

General excursions took place to the Falls of Clyde, Lochwinnoch and Whistlefield and the following observations of botanical interest were made by Messrs. Wm. A. Scott, Richard Prasher and R. Mackechnie respectively:—*Poa chaixii* Vill., *Inula helenium* L., *Polemonium caeruleum* L., *Ornithogallum umbellatum* L., *Saxifraga granulata* L., *Saxifraga umbrosa* L., *Polygonum bistorta* L., *Lonicera xylosteum* L., *Stellaria nemorum* L., *Thelypteris dryopteris* (L.) Slosson, *Lycopodium clavatum* (L.) and *Convallaria majalis* L. in the Falls of Clyde area; *Ranunculus lingua* L., *Nuphar lutea* (L.) Sm., *Polygonum amphibium* L., *Cornus sanguinea* L., *Aster longifolius* Lam., *Elodea canadensis* Michx., *Hippuris vulgaris* L. and *Glyceria maxima* (Hartm.) Holmb. at Lochwinnoch; *Juncus tenuis* Willd., *Carum verticillatum* (L.) Koch, *Plantago coronopus* L., *Plantago maritima* L., *Armeria maritima* (Mill.) Willd., *Sedum anglicum* Huds., *Lycopus europaeus* L., *Scutellaria gariculata* L., *Carex rostrata* Stokes, *Rhynchospora alba* (L.) Vahl, *Menyanthes trifoliata* L., *Gnaphalium uliginosum* L., *Senecio viscosus* L., *Mentha x verticillata* L., *Mentha x piperata* L., *Stachys x ambigua* Sm. and *Ceterach officinarum* DC. near Whistlefield and Garelochhead.

**Other Sections.**

Mr. James Kirkwood reports favourably on geological excursions to Ardmore Peninsula and Auchenroch Glen during the summer months. The winter meetings of the section, however, were discontinued owing to the non-availability of the rooms at St. Andrew's Square following the departure to Tanganyika of Mr. Wm. J. Cannon.

Mr. Frank L. Sinclair reports three zoological excursions to Finnich Glen, Banton Loch and Fenwick Moor, at all of which the aquatic fauna received most attention.

Mr. James Anderson, Convener of the Microscopical Section, reports that lack of special accommodation and equipment still constitute serious obstacles to development of interest in the section.

The report of the Librarian (Mr. Frank L. Sinclair) draws attention to the fact that the Society exchanges publications with 106 British and Foreign Societies, yet small use is made of the Library by members. A gift of books by Miss Gertrude A. Young is gratefully acknowledged.

## DIGEST OF THE PROCEEDINGS OF THE SOCIETY

### 11TH JANUARY, 1955.

Dr. Patton presided.

Mr. C. Eric Palmar, A.R.P.S., presented the exhibition of the photographic section, including films, colour transparencies and other slides, and prints, almost entirely the work of members of the Society.

### 8TH FEBRUARY, 1955.

Dr. Patton presided over the Annual Business Meeting.

Two new members were admitted to the Society: Mr. Roy A. Crowson, B.Sc., 1012 Gt. Western Road, Glasgow, W.2; Mr. James D. Forrest, B.Sc., M.S., Department of Botany, West of Scotland Agricultural College.

Reports of the Society's activities were read by the Secretary, the Treasurer, the Editor and Conveners of Sections, and approved by the meeting. New office-bearers were elected (*see* p. 000).

### 8TH MARCH, 1955.

Mr. W. J. Cannon presided.

Two new members were admitted: Mrs. Elizabeth Crowson, B.Sc., 1012 Gt. Western Road, Glasgow, W.2; Mr. David McLellan, 151 New City Road, Glasgow, C.4.

Mr. C. Eric Palmar, A.R.P.S., gave a lecture entitled "Winter Visitors," dealing mainly with those migrant birds which, breeding to the north of the British Isles, visit Britain in "winter," that is, during the period between the time that young birds become self-supporting, and the beginning of the next breeding season. The lecture was illustrated by a film.

### 18TH APRIL, 1955.

Mr. W. J. Cannon presided.

Two new members were admitted: Mr. A. Herriot, 6 Threestonhill Avenue, Glasgow, E.2; Mrs. Margaret A. Hamilton, 22 Clochbar Avenue, Milngavie.

Mr. David Spence, B.Sc., delivered a lecture on a plant-hunting expedition in the Grand Atlas of Morocco in 1951. The lecture was illustrated by lantern slides and by an exhibition of a collection of herbarium specimens of the flora of Morocco.

9TH MAY, 1955.

Mr. W. J. Cannon presided.

Mrs. S. W. Ferguson, 16 Brighton Place, Glasgow, S.W.1, was admitted to membership of the Society.

The Goodfellow Lecture was delivered by Mr. James D. Hamilton, B.Sc., who took as his subject "Animal plankton of freshwater." The lecture was illustrated by lantern slides, by samples of living plankton from different sources and with a display of apparatus used in plankton studies.

13TH JUNE, 1955.

Mr. W. J. Cannon presided.

Mr. Arthur Tod, 21 Riverford Road, Glasgow, S.3, was admitted to membership of the Society.

The resignation of Mr. W. J. Cannon from the office of President, on his imminent departure to East Africa, was announced.

Mr. Thomas Robertson submitted his list of First Arrivals of summer migrants for the Clyde Area for 1955 (*see* p. 000). The annual "Special Exhibit Night" was held and included displays of material by all sections of the Society.

11TH OCTOBER, 1955.

The meeting opened with Mr. J. Anderson, in the chair. Two new members were admitted to the Society: Miss K. M. Davidson, 22 Whittingehame Drive, Glasgow, W.2; Mr. J. H. Dickson, 3 Rhinie Drive, Ibrox, Glasgow, S.W.2.

Mr. Robert Mackechnie, B.Sc., A.L.S., was elected President, and presided for the remainder of the meeting.

Mr. Richard Prasher gave a lecture on "The Flora of a railway embankment," discussing his observations on plants during thirty-five years' railway service.

8TH NOVEMBER, 1955.

Mr. Robert Mackechnie presided, and personally read an obituary of Mrs. Mary Glen, M.A.

Mr. W. Kenneth Richmond, M.A., M.Ed., gave a talk entitled "The Hen-Harrier, Scotland's most aggressive bird," which was illustrated by lantern slides and a film.

13TH DECEMBER, 1955.

Mr. Robert Mackechnie presided.

Mr. Andrew E. Henderson, B.Sc., Department of Zoology, University of Glasgow, was admitted to membership of the Society.

Mr. James D. Forrest, B.Sc., M.S., gave a talk entitled "Some impressions of my travels through the United States," which was illustrated by colour slides.



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P. 282

# The Glasgow ❖ Naturalist

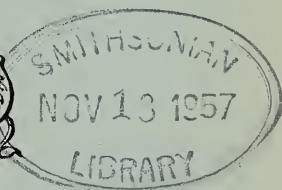
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# CONTENTS

| PAPERS—  | PAGE |
|--|------|
| Additions and corrections to the Liverwort Flora of Dunbartonshire |      |
| A. C. CRUNDWELL ... ..   | 264  |
| The small mammals of a Dunbartonshire oakwood                      |      |
| M. J. Delany ... ..  | 272  |
| A lichen new to Scotland   |      |
| A. C. Crundwell ... ..   | 279  |
| Lumbricidae at Boreray, St. Kilda                                  |      |
| J. Morton Boyd ... ..  | 280  |
| Some records of Clydesdale Fungi                                   |      |
| R. H. Johnstone ... ..   | 282  |
| Additions to the Flora of Possil Marsh                             |      |
| B. W. Ribbons ... ..   | 283  |
| List of first arrivals of summer birds in Clyde Area in 1956       |      |
| Compiled by Thomas Robertson ... ..                                | 284  |
| AN APPRECIATION ... ..   | 263  |
| A CORRECTION ... ..  | 281  |
| LIST OF OFFICE-BEARERS ... ..                                      | 286  |
| NOTES FROM EXCURSION AND SECTIONAL REPORTS                         | 287  |
| RECENT CHANGES IN THE CONSTITUTION OF THE SOCIETY ... ..           | 288  |
| DIGEST OF THE PROCEEDINGS OF THE SOCIETY ...                       | 289  |
| LIST OF MEMBERS ... ..   | 291  |
| INDEX TO VOLUME XVII ... ..  | 297  |

# The Glasgow Naturalist

THE JOURNAL OF THE  
ANDERSONIAN NATURALISTS OF GLASGOW

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## AN APPRECIATION

By R. MACKECHNIE

President of the Society

*(MS. received 22nd April, 1957)*

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When Mr. R. H. Johnstone was elected Treasurer of the Society on 12th February, 1937, in succession to Mr. G. Carrie, it is unlikely that either he or his sponsors anticipated that he would hold the office for twenty years. With his resignation in February last he has established what must surely be a long-service record for any responsible post in the Society's Councils. For twenty years of careful accounting we owe much to Mr. Johnstone; for his activities of the past eighteen months we are specially indebted. In 1955 the Society found itself without a Secretary and with a very inexperienced President. Mr. Johnstone, at that time himself contemplating resignation, at once set his private intentions aside and shouldered additional responsibilities, so that his final year of office must have been the most strenuous of them all.

We shall miss that familiar attaché case, to us as significant as is the Chancellor's despatch box in another place. The gratitude and good wishes of all our members go with Mr. Johnstone into his retirement.

## ADDITIONS AND CORRECTIONS TO THE LIVERWORT FLORA OF DUNBARTONSHIRE.

By A. C. CRUNDWELL, Department of Botany, University of  
Glasgow

(MS. received 17th April, 1957)

While less work has been done on the liverworts of the Glasgow district than on the mosses, there have been many local botanists and visitors who have studied them, and several floristic works have been published. The earliest were the liverwort parts of Lightfoot's *Flora Scotica* (1777) and of Hopkirk's *Flora Glottiana* (1813). Though excellent in their day, these are now of little more than historic interest.

The first of the more modern works is the list of Hepaticae for the West of Scotland by Stirton and Paterson (1876). I have reluctantly decided that this must be set aside as altogether unreliable. *Riccia fluitans*, *Sphaerocarpos Michellii* and other species otherwise unknown from the west of Scotland are treated as too common for the citation of localities. On the other hand, *Lepidozia reptans* and *Jungermannia crenulata* are listed as rare, each with a single locality. Dunbartonshire localities are given for four species not otherwise known from the county: *Jamesoniella Schraderi* from Ben Vorlich, and *Lophozia alpestris*, *Colura calyptrifolia* and *Ricciocarpus natans* from Luss. Only the last of these is improbable, but none can be accepted in the absence of specimens. Stirton's herbarium contains hardly any liverworts, and he seems to have devoted very little attention to them. I have been unable to locate Paterson's collections. He was a professor of Anderson's College and seems to have been principally a mycologist.

Unfortunately the treatment of the liverworts of the Clyde Area in the 1901 British Association Handbook is less satisfactory than that of the mosses. It appears under Ewing's name, with an editorial note by Scott Elliot stating that additional records made by Lee and himself had been added. Ewing evidently regarded this treatment of his manuscript as high-handed, for in 1903 he published a new list, saying of the earlier one, "I disclaim all responsibility, and have no hesitation in saying that it is not correct, though my name appears in conjunction with it." He claimed of his second list that it was the first really satisfactory one for the district, that he had specimens from each locality in his herbarium, and that all the plants had been seen by Macvicar. Nevertheless the second list is by no means as superior to the first as Ewing claimed. The latter certainly suffered from its hybrid

authorship, and it does contain a number of errors; though some of these, such as the records of *Fossombronia caespitiformis*, were almost certainly Ewing's fault, not Scott Elliot's. But the second list, too, is not altogether accurate. Ewing may well have once had specimens in his herbarium in support of every record, but they are certainly not all there now. A large number of his specimens were indeed seen by Macvicar; but some of the records in the list are based upon Ewing's original identifications, not on Macvicar's corrections to them! The limitation of the list to species which Ewing had, or thought he had, in his herbarium resulted in the exclusion of many well-authenticated records. Neither of these two lists can be ignored, but neither is a sure foundation on which to base further work on the liverworts of the Clyde Area.

Ewing's lists for the Clyde Area, and most other Scottish local lists, were superseded by Macvicar's *Distribution of Hepaticae in Scotland* (1910), and I have used the Dunbartonshire data in this as the basis for this paper. In this work Macvicar gave localities for all the Scottish species, more or less by vice-counties, basing it almost entirely on specimens that he had verified himself. He examined a very large quantity of material, and missed few of the older records. Moreover he was extremely accurate, and I have only rarely thought it necessary to check his determinations. The Dunbartonshire records include his own from his visits to Ardlui and to Arrochar. Fuller details of the former were given in an earlier paper (Macvicar, 1902).

Dunbartonshire as understood by Macvicar differs from the Watsonian vice-county 99 in that he followed contemporary county boundaries and included in it the Glenfalloch drainage area of Perthshire. He was responsible for the Scottish records in the second edition (1913) of the Census Catalogue of British Hepatics, and in this too he seems not to have adhered strictly to Watson's vice-counties. Some errors have resulted from an imperfect knowledge of local geography, the Dunbartonshire records including some from the detached part of the county and others from Stirlingshire. These mistakes were evidently often due to the faults of his correspondents. W. Campbell, in particular, was often inaccurate about county boundaries.

The collections of Ewing, Lee and Walton are in the Glasgow University herbarium, that of Macvicar in the British Museum. Both also contain the specimens of earlier collectors—Lyon, the Hookers, Gourlie, etc.—not seen by Macvicar. I have also examined the herbaria of the Glasgow Museum, Kelvingrove, and of the Royal Technical College, Glasgow. That of the Royal Botanic Gardens, Edinburgh, was examined by Macvicar, and as there have been few later



additions to the liverworts I have not searched it thoroughly myself.

In the following list of additions and corrections to Macvicar's data for Dunbartonshire I have not given additional localities for species already recorded from the county unless these are of some special interest. I have kept to the order of Macvicar (1926) though not altogether to his nomenclature ; and I have disregarded the forms and less important varieties accepted by him. " New " county records, *i.e.*, those new to the British Bryological Society, are marked with an asterisk(\*). An exclamation mark after the name of the collector signifies that I have seen a specimen, one after the locality that I have seen the plant growing there in the years 1949-56. Records cited without authority are my own.

*Riccia Warnstorffii* Limpr. ex Warnst. Near Craigendoran, 1916, *J. R. Lee!*, as *R. glauca* var. *minor*. Stubble field near Caldaran. Probably not uncommon, but overlooked as stunted *R. glauca*.

*R. glauca*. Recorded from Balloch by Ewing (1903), but the specimen, seen by Macvicar, is *R. sorocarpa*, which is by far the commonest *Riccia* of the Glasgow district. Stubble fields at Caldaran and Bearsden.

*Targionia hypophylla* L. On trap rocks on cliff above Glenar buck House, Bowling!, *J. Walton*.

*Reboulia hemisphaerica* (L.) Raddi. Loch Humphrey Burn, *Lee!*. Cliff above Glenar buck House.

*Marchantia polymorpha* L. The Milngavie record given by Macvicar is probably in v.c. 86. Recorded by D. A. Boyd from Kilmahew, Cardross, on a Natural History Society excursion, 1893. Rockery, Cardross, *W. Russell Hunter!*.

*Riccardia sinuata* (Dicks.) Trev. Rather common on waste ground at roadsides and on damp earthy rocks, especially where there is a slow drip or trickle of water. Stubble field near Caldaran. Stuckindroin ravine, Ben Vorlich, growing over *Gymnostomum aeruginosum* at 1,050 ft. alt. It is most extraordinary that Macvicar did not record this species as occurring in Scotland at all ; yet it is very widely distributed, and I have seen it in numerous localities from Wigtownshire to Caithness. It is possible that it has been extending its range, but it seems more likely that Macvicar confused it with *R. latifrons*.

[*R. latifrons* (Lindb.) Lindb. Record in Cens. Cat., ed. 3, based on a plant of Lee's from Drumchapel ; but the specimen is *R. multifida*.]

*R. palmata* (Hedw.) Carruth. On rotting logs that have lost their bark ; Ben Vorlich, Glen Douglas and near Ardarroch.

*Cryptothallus mirabilis* Malmb. In a birch wood above Colgrain Farm, near Helensburgh!, *M. V. Brian*.

*Metzgeria fruticulosa* (Dicks.) Evans. On sycamore, Rosdhu, Loch Lomond. Rather stunted on elders at Glenarbuck.

*Pellia borealis* Lorbeer ex K. M. Recorded from "Dumbarton, Loch Lomonds" by Müller (1947). Differs from *P. epiphylla* in its chromosome number, in the longer marginal cells of the thallus, the curved walls of the inner cells, and the larger spores, elaters and cells of the capsule wall. This is the only Scottish record so far, but it may well be widespread.

*Fossombronina pusilla* (L.) Dum. The only record given by Macvicar is from Cumbernauld, which is in v.c. 86. Ardlui (Ewing, 1903), but there is no specimen. Drumchapel, *Lee!*.

*F. Wondraczeki* (Corda) Dum. Woodland ride, Glenarbuck.

*F. foveolata* Lindb. (*F. Dumortieri* Lindb.). Lochan Ghlas Laoigh, *W. Evans* (*Glasg. Nat.*, 2, 144, 1910). Shore of Loch Lomond near Ardlui.

*Gymnomitrion concinnum* (Lightf.) Corda. Abundant on rocks at 1,000 ft. alt., near Greenside Reservoir, Kilpatrick Hills.

*Plectocolea paroica* (Schiffn.) Evans. Arrochar, *Lee!*. Peaty side of ditch, Glen Luss.

[*P. hyalina* (Lyell) Mitt. Under *Eucalyx hyalinus* Macvicar included both this species and the last. Apart from *Lee's* specimen above, all those that I have seen are sterile and not namable with certainty.]

\**Solenostoma sphaerocarpon* (Hook.) Steph. (*Aplozia sphaerocarpa* Dum.). Creeping over *Gymnostomum aeruginosum* on wall, Rosdhu, Loch Lomond.

*Gymnocolea inflata* (Huds.) Dum. Neither of the two localities (Cumbernauld and Milngavie) given by Macvicar is in v.c. 99. The species is common throughout the county, especially on boggy moorlands, but also on sheltered rocks and walls.

*Lophozia silvicola* Buch. This "split" of *L. ventricosa* is distinguished by its oil-bodies, which are 15-25 per cell, spherical, with a pale bluish nucleus surrounded by a thick, somewhat brownish, smooth, transparent sheath. Those of *L. ventricosa* sens. strict. are less numerous, 10-15 per cell, spherical to ellipsoidal, without central nucleus, appearing rough under the low power of the microscope owing to the many small oil-bodies of which they are composed. *L. silvicola* is also said to differ from *L. ventricosa* when they are cultivated together in its paler green colour and in its more deeply incised and relatively narrow leaves; but these characters are much too variable in nature to be of any use in identification.

In Dunbartonshire *L. silvicola* seems to be as common, or nearly so, as *L. ventricosa*, and to have an equally wide range of habitats, which include walls, rocks and peaty moorlands. Opinions differ as to the value of this species. Arnell (1956) accepts it, as does Schuster (1953) more tentatively. Jones (1952) reported that he had found both kinds of oil-body in the same cell; and Müller (1954) rejected it altogether, claiming that the oil-body difference was inconstant. I have no difficulty in placing the majority of specimens definitely in one category or the other, but occasional plants are intermediate. I have seen plants with oil-bodies like those of *L. silvicola* in number and shape, but like those of *L. ventricosa* in structure. In others the outer parts of the oil-bodies are intermediate in appearance, and while some of them have a single nucleus, others have none or more than one. The oil-body difference is probably to some extent genetically determined; but *L. silvicola* seems best regarded as a minor variant without taxonomic significance.

\**Lophozia atlantica* (Kaal.) Schiffn. Ben Vorlich, on birch trunk at 1,000 ft. alt.

*L. attenuata* (Mart.) Dum. Common on rocks and walls, more rarely on tree-trunks, in the south and east of the county, but rare in the Highland part of it. Macvicar noted that its distribution in Scotland as a whole is eastern.

*L. barbata* (Schmid.) Dum. The record given by Macvicar is for Mugdock, in Stirlingshire. Woods above Glenarbuck House, Walton!. Among rocks by the Allt Dubh Uisge, Ardlui.

*Tritomaria exsecta* (Schmid.) Schiffn. Ben Vorlich, Ewing!.

*T. exsectiformis* (Breidl.) Schiffn. On peaty banks at Whistlefield and by the Allt Dubh Uisge. Stump in wood by Loch Long, Portincaple.

*Mylia cuneifolia* (Hook.) S. F. Gray. Still present in 1956, on a birch trunk at nearly 1,000 ft. alt., in Stuckindroin Ravine, Ben Vorlich, where Macvicar saw it in 1901. This and some other of the species that he found there are in danger of disappearance because of the diversion of the stream in connexion with the Loch Sloy hydro-electric scheme. Loch Sloy itself has never been studied bryologically.

*Lophocolea heterophylla* (Schrad.) Dum. Rare and apparently confined to the south of the county. Tree-stump, Garscube. Bole of sycamore, Balloch Park.

*Cephalozia bicuspidata* (L.) Dum. var. *Lammersiana* (Hüb.) Breidl. The only locality given by Macvicar is Milngavie, probably not in v.c. 99. I can find no specimens in support of Ewing's records (1901, 1903) from Helensburgh and Balloch, but I have seen good material on Douglas Muir, mixed with *Dicranella heteromalla* on peat.



*C. media* Lindb. The only locality in Macvicar is Craigmaddie, in Stirlingshire. Rotten wood, Inchtavannach, Leel. Sterile plants that may well be this species are common on shaded rocks and on decaying wood.

*Cephaloziella Starkei* (Funck ex Nees) Schiffn. Some doubt attaches to many of the older records of this, for it used to be almost the only species of the genus ever recorded, whereas *C. rubella* and *C. Hampeana* are probably rather commoner over Britain as a whole. There is no specimen in Macvicar's herbarium to vouch for his record from Arrochar, but I have seen the plant in several places; waste ground by the Clyde, Bowling; male plants, at side of path, Douglas Muir; on birch trunk, 1,000 ft. alt., Stuckindroin Ravine, Ben Vorlich. This seems to be the only species that grows on tree-trunks.

*C. Hampeana* (Nees) Schiffn. On earth-covered stones at base of wall below Douglas Muir. On path, Allander golf-course.

*C. rubella* (Nees) Warnst. Earth-covered rock in pasture above Bowling.

*Odontoschisma Sphagni* (Dicks.) Dum. Record in Cens. Cat., ed. 2. On boggy moorland near Whistlefield, in very small quantity.

*O. denudatum* (Nees ex Mart.) Dum. Record in Cens. Cat., ed. 2. On peaty banks by the Allt Dubh Uisge, and in several places in the Whistlefield district.

*Adelanthus decipiens* (Hook.) Mitt. On rock in wood by Loch Long, Portincaple.

*Calypogeia Trichomanis* (L.) Corda. This species is now divided into two, *C. Trichomanis* sensu K.M. and *C. Muelleriana* (Schiffn.) K.M., the principal difference between them being in the colour of the oil-bodies, which are blue in *C. Trichomanis* but colourless in *C. Muelleriana*. The latter is very common in Dunbartonshire, as in Scotland as a whole, and doubtless all the older records refer to it. I have seen *C. Trichomanis* proper, with bright blue oil-bodies, among *Pellia* in a crevice in block scree at 2,850 ft. alt. on Ben Vorlich, and a similar plant, but with very pale blue oil-bodies, with *Diplophyllum albicans* and *Solenostoma crenulatum* on the peaty side of a ditch in Glen Luss. I have also on several occasions seen plants in which the oil-bodies have a suspicion of a blue tinge, but so faint that it is doubtful whether they should be considered blue or colourless. Oil-body colour seems to be quite constant in each tuft, and there is little doubt that it has some genetic basis; but there is probably an almost continuous gradation from colourless to bright blue. In spite of differences in the geographical distribution of these two seggregates it is very doubtful if the morphological



differences between them are sufficiently constant for both of them to be maintained as full species.

*Lepidozia pinnata* (Hook.) Dum. Rocks in wood by Loch Long, Portincaple.

*Herberta adunca* (Dicks.) S. F. Gray. Macvicar's and other older records include the following species. Ben Vorlich, 1895, *W. Smith!*, 1901, *Macvicar!*. Much less common here than *H. Hutchinsiae*. I have seen it in only one place, on rock-ledges at 2,400 ft. alt. The associated species include *Barbula ferruginascens* and *Tortella tortuosa* and indicate basic conditions, which are favoured by *H. adunca* though not by *H. Hutchinsiae*.

*H. Hutchinsiae* (Gottsche) Evans. By Loch Lomond, Glenfalloch, *J. D. Hooker!*. Ben Vorlich, *Leel!*, *Ewing!*. Very common on the east side at about 1,500 ft. alt. Wood by Loch Long, Arrochar!, *E. C. Wallace*.

*Ptilidium pulcherrimum* (Web.) Hampe. Ewing (1901) recorded this from the head of Loch Lomond, but I know of no specimen from this locality. Bole of oak, Balloch Park.

*Scapania aspera* Bernet. Creinch, *Leel!*

*Radula aquilegia* Tayl. On stone by rivulet on shore of Loch Long, just south of Arrochar.

*Porella Thuja* (Dicks.) Moore. On boulder on shore of Loch Lomond, about two miles south of Ardlui.

*P. platyphylla* (L.) Lindb. Bowling Bay, *G. J. Lyon!*. Cliff above Glenarbuck House, probably the same locality as Lyon's.

*Lejeunea* spp. The older records are unreliable, though those for *L. patens* are probably substantially correct. The following are all that have been named in the light of Greig-Smith's recent (1954) work on the British species. Most have been seen by Greig-Smith.

*L. cavifolia* (Ehrh.) Lindb. On rocks, Glenarbuck and by the Allander.

*L. lamacerina* Gottsche ex Steph. Birch roots by streamlet on shores of Loch Long, Arrochar. On rocks, Allt Dubh Uisge.

\*Var. *azorica* (Steph.) Greig-Smith. On rocks in Stuckindroin Ravine, Ben Vorlich.

*L. patens* Lindb. Frequent on damp rocks. Kilpatrick Hills, at Lang Craigs and near Greenside Reservoir. Allt Dubh Uisge. By stream, Portincaple.

*Marchesinia Mackaii* (Hook.) S. F. Gray. Near Inverarnan, *W. Watson (Rep. B. B. S., 4, 45, 1938)*.

*Frullania Tamarisci* (L.) Dum. var. *robusta* Lindb. Wet rocks by waterfall, Lang Craigs, Kilpatrick Hills.

*Anthoceros Husnoti* Steph. Stubble fields, Luss and Fruin Bridge. Probably much commoner in Scotland than the very few records suggest. Easily overlooked as a large form of *A. punctatus*.

*A. laevis* L. Stubble fields near Caldarvan and near the Craigton School.

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## THE SMALL MAMMALS OF A DUNBARTONSHIRE OAKWOOD

By M. J. DELANY

(MS. received 17th May, 1957)

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One of the earliest accounts of the mammal fauna of Dunbartonshire appeared in 1796 when Stuart provided a list of the 'Quadrupeds' found within the parish of Luss. Included in the list are two of the species the author found in the present survey. These are the 'field mouse,' *Mus* (now *Apodemus*) *sylvaticus* L., and the 'foetid shrew mouse,' *Sorex araneus* L. In 1895, Lumsden and Brown produced an annotated list of the mammals of Loch Lomond and neighbourhood. They recorded all three species of small mammals studied in the present work. The new addition to Stuart's records was the bank vole, *Arvicola* (now *Clethrionomys*) *glareolus* (Schreb.) which was reputed to have been seen 'near Luss.' The present survey was undertaken between March, 1955 and September, 1956 in Allt a' Ghualliann Wood, Dunbartonshire. It attempted to determine the distribution pattern and relative abundance of the shrews, mice and voles inhabiting the wood.

Allt a' Ghualliann Wood lies immediately east of the main road from Alexandria to Tarbet and approximately four miles south of Luss. The shores of Loch Lomond form its eastern boundary. It is long and narrow, covers an area of sixty-three acres and is nowhere more than half a mile from north to south nor more than a third of a mile from east to west. A number of minor undulations occur within the wood with the western sector rising to between fifty and a hundred feet above sea level. Continuous with Allt a' Ghualliann Wood and lying to its north-east is a further strip of twenty-four acres of open woodland which is likewise bordered to the east by the loch. The northern boundary of the main wood and the western boundary of its appendage impinge on an area of open pasture (Ross Park), while the Finlas Water forms the northern limit of the wooded extension. Maps of the area, based on the Ordnance Survey 25-inch and 6-inch to the mile projections, are given in Figures 1 and 2. Oaks predominate in the wood although a number of other trees including beech, pine, yew and alder are also present. The main drive is fringed by a dense growth of rhododendrons which extend, in certain localities, well into the wood.

Longworth traps were used throughout the survey and were prebaited for a period of twenty-four hours. Prebaiting

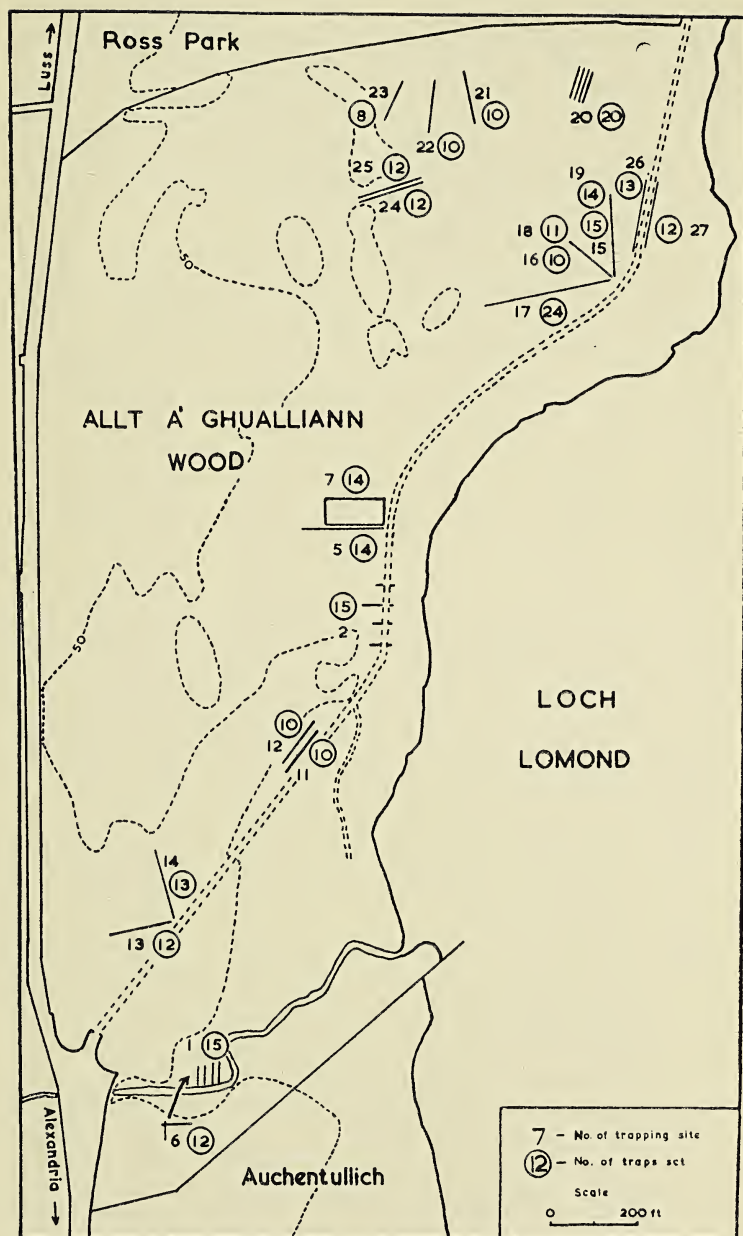


Fig. 1.—Map of the small mammal trapping sites in Allt a' Ghuallian Wood, Dunbartonshire.



involves placing the baited trap in position without setting it. Oatmeal or synthetic rat food were used as bait. Chitty and Kempson (1949), the designers of the trap, demonstrated a higher catch to result from the prebaiting procedure. After the prebaiting period had elapsed the traps were set and left for a further twenty-four hours. They were then examined and the catch removed. The small mammals were killed and permanently removed from the habitat.

The traps were in most cases laid at five yard (pace) intervals along a straight line. The number in a line ranged from three to twenty-four and their locations have been inserted in Figures 1 and 2. The uncircled number is a reference to the trapping site and the circled one to the number of traps set. No precise record was retained of the positions of sites 13 and 14 and only their approximate locations have been inserted. Exceptions from the orthodox five yard trap interval occurred at: sites 7 and 8, where the traps were scattered within the enclosed areas; site 9, where they were irregularly spaced along a sixty-two yard line and at site 10, where the interval was ten yards in place of the customary five.

The distribution of small mammals is appreciably influenced by vegetation as the latter affords both food, and where sufficiently dense, cover from predators. The pattern has accordingly been noted wherever trappings have been made with particular emphasis placed on the composition of the shrub and herb layers. Each trapping was made in a comparatively uniform vegetation type which could be arbitrarily fitted into one of four categories, viz. :—

- (i). Dense rhododendrons accompanied in some instances by bramble. Here a heavy cover persisted throughout the year; vegetation beneath the rhododendrons was virtually absent.
- (ii). The more open areas of the wood with a rich herb layer. The commoner plants were bluebell (*Scilla nonscripta* Hoffm. and Link), woodsage (*Teucrium scorodinia* L.), red campion (*Lychnis dioica* L.), tormentil (*Potentilla tormentilla* Neck.), wood sorrel (*Oxalis acetosella* L.), creeping buttercup (*Ranunculus repens* L.), fioirin grass (*Agrostis stolonifera* L.), heath bedstraw (*Galium saxatile* L.), sheep's sorrel (*Rumex acetosella* L.), speedwell (*Veronica* sp.), bracken (*Pteris aquilina* L.) and male fern (*Aspidium filix-mas* Sw.). The bracken and fern were never of such abundance or stature to form a very thick canopy.
- (iii). This habitat differed from (ii) in having a more extensive development of bracken (about four feet tall).

It was composed of some of the areas included under (ii) in the earlier part of the summer when the bracken was still young and comparatively short.

(iv.) Very dense bracken six or seven feet high. *Agrostis* covered the floor.

TABLE I.

SMALL MAMMALS TRAPPED IN ALLT A' GHUALLIANN WOOD,  
DUNBARTONSHIRE

MARCH, 1955—SEPTEMBER, 1956

| Site No. | Date | No. of<br>traps set | Captures        |                      |              | % Success |
|----------|------|---------------------|-----------------|----------------------|--------------|-----------|
|          |      |                     | <i>Apodemus</i> | <i>Clethrionomys</i> | <i>Sorex</i> |           |

**Habitat (i): Dense canopy of rhododendrons with or without  
bramble.**

|    |           |    |   |   |   |    |
|----|-----------|----|---|---|---|----|
| 1  | iii.'55   | 15 | 7 | — | 1 | 53 |
| 2  | iii.'55   | 15 | 7 | 1 | 4 | 80 |
| 5  | vi.'55    | 14 | 2 | 1 | — | 21 |
| 6  | 15. v.'56 | 12 | 3 | 7 | 1 | 94 |
| 7  | 15. v.'56 | 14 | 3 | 7 | — | 71 |
| 11 | 27. v.'56 | 11 | 2 | 6 | — | 73 |
| 12 | 27. v.'56 | 10 | 4 | 4 | — | 80 |
| 13 | 6.vi.'56  | 12 | 2 | 6 | — | 67 |
| 14 | 6.vi.'56  | 13 | 2 | 6 | — | 62 |
| 26 | 20.ix.'56 | 13 | 1 | 7 | — | 62 |
| 27 | 20.ix.'56 | 12 | 3 | 4 | — | 58 |

|       |     |    |    |   |
|-------|-----|----|----|---|
| Total | 141 | 36 | 49 | 6 |
|-------|-----|----|----|---|

Overall success—64.54%

**Habitat (ii): Open vegetation.**

|    |            |    |   |   |   |    |
|----|------------|----|---|---|---|----|
| 8  | 15. v.'56  | 14 | 6 | 3 | — | 64 |
| 9  | 27. v.'56  | 10 | 1 | 3 | — | 40 |
| 10 | 27. v.'56  | 10 | — | — | — | 0  |
| 15 | 6.vi.'56   | 15 | 1 | 1 | — | 13 |
| 16 | 6.vi.'56   | 10 | — | 4 | — | 40 |
| 17 | 17.vii.'56 | 24 | 2 | 2 | — | 17 |
| 21 | 24.vii.'56 | 10 | 3 | — | — | 30 |
| 22 | 24.vii.'56 | 10 | — | — | — | 0  |
| 23 | 24.vii.'56 | 8  | 1 | 1 | — | 25 |
| 24 | 20. ix.'56 | 12 | 2 | 1 | — | 25 |
| 25 | 20. ix.'56 | 12 | 6 | 1 | — | 60 |

|       |     |    |    |   |
|-------|-----|----|----|---|
| Total | 135 | 22 | 16 | 0 |
|-------|-----|----|----|---|

Overall success—28.15%

**Habitat (iii): Moderately dense bracken.**

|       |            |    |   |   |   |    |
|-------|------------|----|---|---|---|----|
| 18    | 17.vii.'56 | 11 | — | 1 | — | 9  |
| 19    | 17.vii.'56 | 14 | 2 | 4 | — | 43 |
| Total |            | 25 | 2 | 5 | 0 |    |

Overall success—28.00%

**Habitat (iv): Dense bracken.**

|    |            |    |   |   |   |    |
|----|------------|----|---|---|---|----|
| 20 | 17.vii.'56 | 20 | 4 | 3 | — | 35 |
|----|------------|----|---|---|---|----|

Overall success—35.00%

The results of the trappings have been incorporated in Table I. Of the three species obtained, *C. glareolus* was the most abundant (73 trapped), with *A. sylvaticus sylvaticus* (64 trapped) almost as numerous and *S. araneus* (6 trapped) apparently present in relatively small numbers. Table I reveals an appreciably higher trapping success in habitat (i) where the rhododendrons provided perennial cover. Confirmation

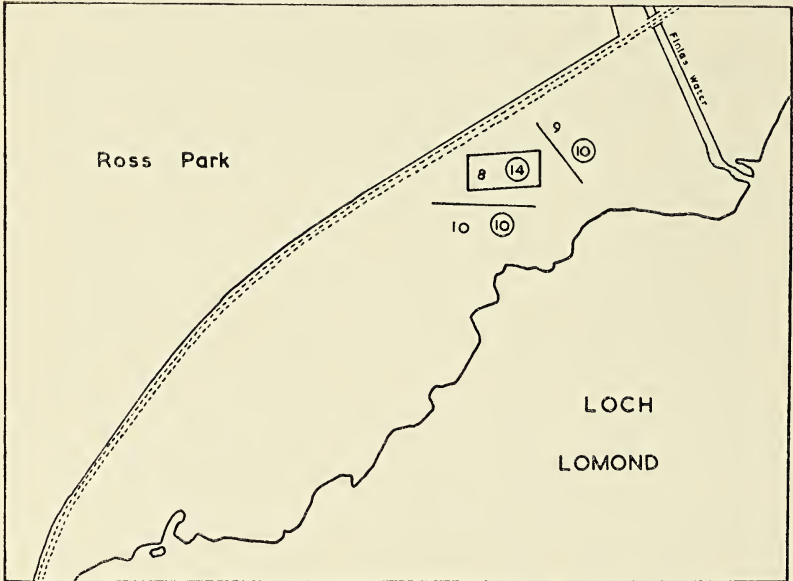


Fig. 2—Map of the small mammal trapping sites in the northern extension of Allt a' Ghuallian Wood, Dunbartonshire. The legend is the same as in Fig. 1 except for a slight reduction in scale.

of this observation has been obtained from a statistical analysis of the data. The construction of a  $2 \times c$  contingency table (Simpson and Roe, 1939) for the variates, habitats and traps occupied and unoccupied gives a value of  $\chi^2 = 41.085$ . With three degrees of freedom  $P < 0.001$ . The small value of  $P$  suggests some difference to exist between the numbers of mammals caught at the different habitats other than could be accounted for by chance. The most striking difference in percentage captures occurs between habitat (i) and the remaining three habitats. A combination of the data from habitats (ii) to (iv) in a further contingency table gives  $\chi^2 = 0.293$  which with two degrees of freedom makes  $P = 0.9 - 0.8$ . It would thus appear that no significant difference exists in the numbers of small mammals caught in habitats (ii) to (iv).

These conclusions assume the utilisation of identical techniques for the variates being compared. It is possible that the figures could be biased by such factors as, trappings being made in different habitats at different times of the year and the employment of a none uniform method of trap dispersion. Habitats (i) and (ii) were examined more systematically than (iii) and (iv) and consequently the data from them probably provides the more reliable sources of comparison. In habitat (i) trappings covered a wider time span (March to September) than habitat (ii) (May to September). Furthermore, habitat (ii), unlike habitat (i), was trapped in July. Even if these factors are taken into consideration and it is appreciated that the statistics must be influenced to some extent by variations in the sampling data it would appear improbable that they are of such a magnitude as to influence the general inference. Namely, that the populations of small mammals are appreciably higher in habitat (i) than habitat (ii).

TABLE II.

RELATIVE FREQUENCY OF SMALL MAMMAL SPECIES IN THE DIFFERENT HABITATS WITHIN ALLT A' GHUALLIANN WOOD, DUNBARTONSHIRE

| Habitat | Total animals trapped | RELATIVE FREQUENCY |                      |              |
|---------|-----------------------|--------------------|----------------------|--------------|
|         |                       | <i>Apodemus</i>    | <i>Clethrionomys</i> | <i>Sorex</i> |
| (i)     | 91                    | 0.40               | 0.54                 | 0.07         |
| (ii)    | 38                    | 0.58               | 0.42                 | 0.00         |
| (iii)   | 7                     | 0.29               | 0.71                 | 0.00         |
| (iv)    | 7                     | 0.57               | 0.43                 | 0.00         |

The preceding analysis throws no light on differences in species composition of the small mammals in the various habitats. The relative abundance of the different species has been displayed in Table II. The mouse and the vole occurred in all four habitats but in none did the numbers of one species considerably exceed those of the other. However, it is noted that in habitat (i) the vole was numerically dominant and in habitat (ii), the mouse. Whether such differences could be regarded as real or due simply to chance variations requires more detailed examination. The data have been subjected to further statistical treatment and contingency tables have been constructed for the variates, habitat and numbers of *Apodemus* and *Clethrionomys* present in each. The analysis is complicated by the small size of the samples in habitats (iii) and (iv). Calculations of adjusted and unadjusted values of  $\chi^2$  have been made. The resulting figures are 2.341 and 3.888 respectively, which with three degrees of freedom, makes *P* fall within the range 0.7 - 0.2. The analysis has been extended by



undertaking a test of association between mouse and vole components of habitats (i) and (ii); here  $\chi^2 = 2.545$ . With one degree of freedom  $P$  has a value between 0.2 and 0.1.

The level of significance of  $P$  is generally accepted as 0.05. This means that if  $P$  is less than 0.05 a difference is suggested between the items being compared which could not be accounted for by chance variation alone and if  $P$  is greater than 0.05 no such difference exists. In the three analyses on the composition of the mammal faunas  $P$  was invariably greater than 0.05 and it is concluded that relative differences in faunal composition were not statistically significant.

Summarizing the foregoing results; there is apparently a significantly higher total number of small mammals inhabiting the rhododendrons and bramble than elsewhere and there is no indication of either mice or voles displaying a predilection for a particular habitat to the exclusion or significant reduction in numbers of the other species. Brown (1954) found *Apodemus* and *Clethrionomys* to be co-dominant in a, predominantly beech, wood. He also observed that small mammals were distributed mainly in the undergrowth. In the survey of Allt a' Ghualliann Wood rigid comparisons are hampered by the small number of trappings undertaken in the moderately dense and dense bracken. These two habitats display varying amounts of cover at different times of the year and in this respect differ from the rhododendron-bramble association where the amount is relatively constant.

I am indebted to Sir Ivar I. Colquhoun, Bt., of Luss for permitting me to conduct the survey on his private estate and to Professor C. M. Yonge, C.B.E., F.R.S., for the facilities provided in his Department. My thanks are also due to Dr. A. M. M. Berrie who was kind enough to identify the plants collected from the open woodland, and to Mr. I. J. Linn for his helpful criticism of the manuscript.

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## A LICHEN NEW TO SCOTLAND

By A. C. CRUNDWELL, Department of Botany, Univeristy of  
Glasgow

(MS. received 6th May, 1957)

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In June, 1954, when botanising in Morvern, Argyll (vice-county 97), with Mr. E. C. Wallace and Dr. H. Milne-Redhead, I collected from rocks on the wooded cliff to the east of Loch Aline the lichen *Sticta sinuosa* Pers. (*S. damaecornis* Ach. var. *sinuosa* Nyl.), a species not previously recorded from Scotland. The identification has kindly been confirmed by Dr. G. D. Scott and by Dr. R. Santesson.

There are no other Scottish lichens for which *Sticta sinuosa* is likely to be mistaken. It is bright green when moist, while the other Scottish species of *Sticta* belong to the subgenus, or separate genus, *Stictina*, with blue-green algal cells. *Lobaria laetevirens*, which belongs to the same family and which was very abundant at Loch Aline, has a superficial resemblance to it but is without cyphellae on the under side of the thallus.

*Sticta sinuosa* is widely distributed in the tropics and subtropics, but in Europe it has been known hitherto only from south-western Ireland, where it occurs in a few localities in Kerry and Cork. Its habitat there is apparently similar, maritime rocks and rocks in woodland. The Scottish plants were sterile, though it is known fertile from Ireland.

Although there are present within a few miles of Loch Aline several of the rarer oceanic bryophyte species (e.g., *Trichostomum hibernicum* and *Sematophyllum Novae-Caesareae*), the district is not outstandingly rich in them, and it seems likely that further work will show *Sticta sinuosa* to occur also in other localities in the west of Scotland. Much work was done on the bryophytes and lichens of the west of Ireland during the first half of the nineteenth century, but comparatively little on the western Highlands of Scotland until quite recently. Much more still remains to be done. It is unlikely that many more oceanic bryophytes will be found in Scotland, but the study of lichens has been much neglected in Britain, and the fact that one so distinctive as *Sticta sinuosa* had not been found here before suggests that there are many more species awaiting discovery in Scotland, and that there is here a profitable field for an experienced lichenologist.

## LUMBRICIDAE AT BORERAY, ST. KILDA

By J. MORTON BOYD, Department of Zoology, Glasgow University

(MS. received 6th March, 1957)

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The Lumbricidae of Hirta, St. Kilda, have recently been described (Boyd, 1956a). Hirta is the main island of the group, and the only one which was permanently inhabited, before the evacuation of the human population in 1930. However, all the other islands and the larger stacs, were visited regularly by the natives to catch sea-fowl and attend to sheep. Cultivated soils were in the main restricted to the immediate precincts of the village and certain other walled enclosures on Hirta, but evidence of lazy-bed cultivation exists on the north-western end of Dun. The grasslands of the two remaining islands, Soay and Boreray, have been less investigated.

During the course of four visits to Dun between 1952 and 1956, totalling about eight hours ashore, the author was engaged in digging out nesting burrows of puffins *Fratercula arctica* and Leach's petrels *Oceanodroma leucorhoa*, and was interested to collect any earthworms which might have been unearthed in the digging. None were seen.

On 23rd and 27th June, 1956, as a member of the Glasgow University Expedition, the author spent a total of about three hours on Boreray. At a cluster of stone cells called Cleitean McPhaidein, used at one time by the natives for the storage of sea-fowl, feathers and wool, digging was done and stones removed from the turf. Lumbricids were encountered almost immediately, in the vicinity of burrows occupied by Leach's petrels. Numerous stones were turned over and it appears that the Lumbricid population is comparatively dense. Specimens were collected and identified. At least two species were present: *Allolobophora caliginosa* forma *typica* Savigny and *Bimastus eiseni* Levinsen. These are records not included in the geographical distribution of the Lumbricidae in the Hebrides as outlined by Boyd (1956b).

It is worth noting that the occurrence of *A. caliginosa* and *B. eiseni* in exactly the same soil locality is unusual. In English Lake District woodlands, Satchell (1955) has shown that the two species are to be found in soils of distinctly different character. The pH of the soil can be correlated with the occurrence of the species; *Allolobophora* species are acid-intolerant, and *B. eiseni* is acid-tolerant. Similarly, in the Hebrides, Boyd (1957) has also shown that the two species are ecologically distinct, *A. caliginosa* predominating in the



calcareous grassland soils, and *B. eiseni* in the moorland soils. The abundance of these two species together on Boreray might well be connected with the modification of the soil habitat by sea-bird droppings. Unfortunately, no pH measurements were made during the visits. It is possible, however, that with the heavy deposition of droppings in spring and summer, followed by no deposition and greatly increased leaching in autumn and winter (the soil mantle is on a steep slope) a fairly large seasonal change occurs in the chemical characteristics of the soil. This may produce variations in the pH of the soil. The environment might be more favourable to the existence of *one* species during spring and summer, and more favourable to the *other* during autumn and winter.

#### ACKNOWLEDGMENTS

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## HYDROMEDUSAE OF THE CLYDE SEA AREA—

### A CORRECTION

By M. VANNUCCI

(MS. received 2nd April, 1957)

With reference to the paper entitled "Notes on the Hydromedusae of the Clyde Sea Area with new distribution records" published in this journal (*Glasg. Nat.*, **17**, 243-249), the following correction is now submitted.

Professor Kramp, after examining the specimens recorded as *Leuckartiara brevisconis*, has decided that they are actually *Neoturris pileata*. The following alterations should therefore be made :—

p. 246, l. 12, and p. 247, l. 4-5, delete *Leuckartiara brevisconis*.  
 p. 247, l. 3 and 4, change 'three' to 'two,' and delete *Leuckartiara brevisconis*.

Table I. Delete *Leuckartiara brevisconis* and change the number of *Neoturris pileata* in col. 2 from 18 to 21.



## SOME RECORDS OF CLYDESDALE FUNGI

By R. H. JOHNSTONE

(MS. received 16th May, 1957)

Some further records in continuation of those published in the *Glasgow Naturalist*, v. 15, Part 2, and v. 17, Part 1, are now submitted. None of the species below is included in the *British Association Handbook* (1901) or in the Clyde Card Catalogue.

## HYMENOMYCETES

|   |             |          |
|---|-------------|----------|
| * <i>Cortinarius glandicolor</i> Fr.          | Craigallion | 26/ 9/53 |
| <i>Cortinarius phoeniceus</i> (Bull.) Maire   | Balloch     | 25/ 9/48 |
| <i>Inocybe lanuginella</i> Schroet.           | Garscube    | 22/ 9/52 |
| * <i>Tricholoma cognatum</i> Fr.              |             |          |
| (= <i>T. arcuatum</i> (Bull.) Quel.)          | Dougalston  | 18/10/52 |
| * <i>Tricholoma immundum</i> Berk.            | Mains Wood  | 11/10/47 |
| * <i>Clitocybe umbonata</i> Fr.               |             |          |
| (= <i>Cantharellus umbonatus</i> (Gmel.) Fr.) | Dougalston  | 18/10/52 |
| * <i>Psilocybe atrorufa</i> (Schaeff.) Fr.    |             |          |
| among short grass on sandy soil               | Erskine     | 29/ 9/54 |
| <i>Mycena avenacea</i> Fr.                    | Erskine     | 29/ 9/53 |
| <i>Psathyra gossypina</i> (Bull.) Fr.         | Cadder      | 24/ 9/53 |
| * <i>Omphalia bisphaerigera</i> Lange         | Dougalston  | 25/20/55 |
| <i>Clavaria acuta</i> (Sow.) Fr.              | Balloch     | 21/ 9/54 |

## DISCOMYCETES

|   |          |          |
|---|----------|----------|
| * <i>Galactinia Sarrazini</i> Boudier                   | Erskine  | 29/ 9/54 |
| * <i>Otidea alutacea</i> (Pers. ex Fr.) Mass.           | Overtoun | 25/ 9/54 |
| <i>Anthrocobia melaloma</i> (Alb. & Schw. ex Fr.) Boud. |          |          |
|   | Erskine  | 29/ 9/53 |

\*These specimens have been identified at Kew except for *T. immundum* submitted to the late A. A. Pearson, F.L.S. and the two Discomycetes to W. D. Graddon, B.Sc.

## ADDITIONS TO THE FLORA OF POSSIL MARSH

By B. W. RIBBONS

(MS. received 20th June, 1957)

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On a visit to Possil Marsh, 12th June, 1957, Mr. R. Mac-  
kechnie and I noticed the following three species which are  
not given in Patton and Rennie's recent list (The Plants of  
Possil Marsh, *Glasg. Nat.* 17, 161-172, 1955).

*Dryopteris austriaca* (Jacq.) Woynar, numerous large plants  
growing in among the various groups of sallow (*Salix atro-  
cinerea*) bushes.

*Eleocharis palustris* (L.) R. Br. emend. Roem. & Schult.  
Ssp. *palustris*, a small patch near one group of sallow bushes  
on the east side of the marsh.

*Carex aquatilis* Wahlenb., in considerable quantity around  
the east and south-east edges of the marsh, growing with  
*Equisetum fluviatile* L.

Specimens have been desposited in the Hebarium, Depart-  
ment of Botany, University of Glasgow.

**LIST OF FIRST ARRIVALS OF SUMMER BIRDS IN  
CLYDE AREA IN 1956. COMPILED FROM REPORTS OF  
MEMBERS AND FRIENDS**

By THOMAS ROBERTSON

| <i>Bird</i>                          | <i>Date</i>                                  | <i>Locality</i>  | <i>Average<br/>Date<br/>over 62<br/>years</i> | <i>Earliest<br/>Date, 1955</i> |
|--------------------------------------|--|--|---|--------------------------------|
| <b>Chiffchaff</b>                    | Feb. 20<br>Mar. 11<br>Mar. 31                | Southend, Kintyre<br>Maidens<br>Lamlash                  | April 7                                       | Mar. 27                        |
| <b>Lesser Black-<br/>Backed Gull</b> | Mar. 6<br>Mar. 12                            | Clyde at Clyde Street, Glasgow<br>Southend, Kintyre      | Mar. 6  | Jan. 1                         |
| <b>Wheatear</b>                      | Mar. 19<br>Mar. 22<br>Mar. 29                | Southend<br>Eaglesham<br>Bute                            | Mar. 24                                       | Mar. 28                        |
| <b>Sand Martin</b>                   | April 10<br>April 14<br>April 18             | Crookston<br>Dalry<br>Southend                           | April 8                                       | April 6                        |
| <b>Terns (Common<br/>and Arctic)</b> | April 11<br>April 26<br>April 27             | Dunure<br>Wemyss Bay<br>Southend                         | May 2   | April 22                       |
| <b>Swallow</b>                       | April 12<br>April 13<br>April 15             | Balgray Dam, Renfrewshire<br>Dalry<br>Bishop Loch        | April 10                                      | April 5                        |
| <b>House Martin</b>                  | April 13<br>April 23<br>April 27             | Clarkston, Renfrewshire<br>Linwood<br>Dalry              | April 25                                      | April 8                        |
| <b>Common<br/>Sandpiper</b>          | April 14<br>April 16<br>April 18             | Balgray Dam<br>Dalry<br>Rosebank, Carluke                | April 13                                      | April 10                       |
| <b>White Wagtail</b>                 | April 15<br>April 21                         | Castle Semple Loch<br>Merryton, Hamilton                 | April 4                                       | April 4                        |
| <b>Cuckoo</b>                        | April 18<br>April 22<br>April 22<br>April 22 | Kilmacolm<br>Calder Glen<br>Drymen<br>Tarbert, Loch Fyne | April 22                                      | April 17                       |
| <b>Willow<br/>Warbler</b>            | April 19<br>April 19<br>April 20             | Bridge of Weir<br>Kilmacolm<br>Garscube, Glasgow         | April 12                                      | April 6                        |

| <i>Bird</i>                    | <i>Date</i>                                  | <i>Locality</i>                                     | <i>Average<br/>Date<br/>over 62<br/>years</i> | <i>Earliest<br/>Date, 1955</i> |
|--------------------------------|--|---|---|--------------------------------|
| <b>Redstart</b>                | April 21<br>April 22<br>April 28             | Craigallion<br>Tarbert, Loch Fyne<br>Loch Lomond    | April 26                                      | April 16                       |
| <b>Tree Pipit</b>              | April 22<br>April 22<br>April 29<br>April 29 | Bute<br>Tarbert, Loch Fyne<br>Drymen<br>Strathblane | April 23                                      | April 24                       |
| <b>Corncrake</b>               | April 22<br>April 23<br>April 27             | Drymen<br>Southend<br>Lennoxtown                    | April 25                                      | April 24                       |
| <b>Wood Warbler</b>            | April 22                                     | Bute  | May 2   | April 30                       |
| <b>Whinchat</b>                | April 26<br>May 4                            | Southend<br>Lochranza                               | April 28                                      | April 23                       |
| <b>Common<br/>Whitethroat</b>  | May 3<br>May 5<br>May 8                      | Sannox, Arran<br>Pollok Park, Glasgow<br>Dalry      | May 1   | April 30                       |
| <b>Sedge<br/>Warbler</b>       | May 3<br>May 5<br>May 7                      | Lamlash<br>Dalry<br>Southend                        | May 2   | May 1                          |
| <b>Spotted<br/>Flycatcher</b>  | May 5<br>May 21                              | Sannox, Arran<br>Aberfoyle                          | May 10  | May 12                         |
| <b>Swift</b>                   | May 7<br>May 7                               | Dalry<br>Glasgow (two localities)                   | May 2   | April 29                       |
| <b>Grasshopper<br/>Warbler</b> | May 10<br>May 13                             | Shiskine, Arran<br>Drymen                           | May 5   | April 27                       |
| <b>Sandwich<br/>Tern</b>       | April 14<br>May 9                            | Troon<br>Kildonan, Arran                            | —   | —                              |



SESSION XXVI-1956

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## NOTES FROM EXCURSION AND SECTIONAL REPORTS

(1956)

*(Full reports may be consulted at the Library)*

At the time of going to press, reports on seven excursions are to hand. The botanical excursions served a particularly useful purpose this session in that records were made for the Maps Distribution Scheme of the B.S.B.I., with the result that Glasgow and the surrounding area have now been reasonably adequately covered in the scheme.

The reports are summarised as follows :—

1. General excursion to Auchincruive on 2nd April.—Mr. Forrest reports that 14 members visited the West of Scotland Agricultural College there. Various members of College staff gave informative accounts of the research and advisory work being done at the College, of particular interest being that of the use of radio-active iodine in resolving some of the problems connected with the soil application of various chemicals for the control of potato root eelworm. The poultry unit and the horticultural department were also visited. Botanical specimens especially noted included *Equisetum hyemale* L., *Lamium hybridum* Vill. and *Veronica persica* Poir.

2. General excursion to Aberfoyle on 21st May.—A party of 13 under the leadership of Professor Braid, spent a very full and interesting day in the Aberfoyle district. In addition to interesting interludes on local history (given by Mr. Anderson) and on local geology (given by Messrs. Nicol and Forrest), the following noteworthy botanical specimens were recorded :—*Agrimonia odorata* (Gouan) Mill., *Peucedanum ostruthium* (L.) Koch, and *Allium scorodoprasum* L., in the Killearn area; *Davidia involucrata* Baill., at Glashart; and, elsewhere, *Draba muralis* L., *Pentaglottis semper-virens* (L.) Tausch, *Lysimachia nemorum* L. and *Lysimachia vulgaris* L. Miss Scott and Mr. Morrison helped in the identification of birds, amongst which were noted swans and cygnets, coots with chicks, mallard and ducklings, swift, swallow, house martin, sand martin, whitethroat, curlew, bullfinch and spotted flycatcher.

3. General excursion to Millport on 2nd June.—A small party led by Mr. Boyd spent a very profitable day in the Fintry Bay district, where were made a number of interesting records including *Cardaria draba* (L.) Desv., *Erodium cicutarium* L., *Vicia angustifolia* (L.) Reichard, a species of giant *Heracleum* (probably *Heracleum mantegazzianum* Somm. & Lev.) at Portachur Point; *Myrica gale* L., *Pinguicula vulgaris* L., stunted specimens of *Sorbus aria* (L.) Crantz, *Orchis purpurella* T. & T. A. Steph., and *Schoenus nigricans* L., in adjacent boggy heaths; while elsewhere were noted *Ornithogallum umbellatum* L. and *Rosa spinosissima* L. The encroachment of *Pteridium aquilinum* (L.) Kuhn on the shore of Fintry Bay was noted as typifying a current trend taking place on the sand dunes of the mainland bays. Amongst birds noted were gannets, a tern, oyster catchers, ringed plovers, lapwings, skylarks, a willow wren, stonechat, a corncrake, curlew and thrush.

4. General excursion to Portencross, 7th July.—Despite a small attendance of members, Mr. Boyd was able to report on a day full of interesting observations. The following plant records were made :—*Ranunculus fluitans* Lam. (in Kilbride Burn), (and at or near Portencross) *Ononis repens* L., *Cakile maritima* Scop., *Rhynchosinapis monensis* (L.) Dandy, *Raphanus maritimus* Sm., *Oenanthe lachenalii* Gmel.,

*Ligusticum scoticum* L., *Malva sylvestris* L., *Anagallis arvensis* L., *Coronopus squamatus* (Forsk.) Aschers.; the trap dyke furnished, amongst others, *Koeleria gracilis* Pers., *Trifolium arvense* L., *Crithmum maritimum* L. (which was a rediscovery as it had not been noted here since 1943), and *Melilotus officinalis* (L.) Lam. Birds which caught the eye were the corn bunting, whitethroat, oyster catcher, tern, various gulls, the gannet, swallow and skylark.

5. General excursion to Stirling, 4th August.—This proved also to be a very rewarding excursion to the nine members who took part. The more notable "finds" were:—*Scleranthus annuus* L., and *Trifolium striatum* L. near the Ladies' Rock; *Chelidonium majus* L. and *Malva sylvestris* L. (new records) near the Castle, where, however, was noted the absence of *Smyrniolum olusatrum* L., *Viola odorata* L., *Sedum album* L. and *Atropa belladonna* L.; other records included *Brassica oleracea* L., *Carduus crispus* L., *Conium maculatum* L., *Aethusa cynapium* L., *Tanacetum vulgare* L., *Lamium album* L., *Echium vulgare* L., *Asplenium trichomanes* L. and *Asplenium ruta-muraria* L. The most heartening record of all, however, lies in the name of the author of the report, viz., "John R. Lee"—one might add 'sempervirens'—to whom a special salute is due.

6. General excursion to Loch Libo, 1st September.—The President, Mr. R. Mackenzie, reports that 8 members recorded 125 plant species on a Distribution Map Card. Among these records were:—*Carex aquatilis* Wahlenb., *Carex paniculata* L., *Salix pentandra* L., *Stachys x ambigua* Sm., *Cicuta virosa* L., *Potentilla anglica* Laicharding.

A number of sectional excursions were also held. Reports on these are not to hand, although that to Cleghorn Woods (led by Mr. Prasher) is known to have yielded the following records:—*Ranunculus auricomus* L., *Endymion nonscriptus* (L.), Gareke, *Vinca minor* L., *Adoxa moschatellina* L., *Polystichum labatum* (Huds.) Woyнар, *Lathraea squamaria* L., *Prunus padus* L., *Milium effusum* L., *Melica nutans* L., *Melica uniflora* Retz. and *Myrrhis odorata* (L.) Scop.

## RECENT CHANGES IN THE CONSTITUTION OF THE SOCIETY

When, in the autumn of 1955, I became the Society's President, the membership was about 260. This was the highest total ever reached in the history of the Society, and taken by itself could indicate that the Society was in a flourishing condition. But when one considered that it represented no more than 1 in 4,000 of the city's population, the position looked less satisfactory. Even more disquieting were the poor attendances at lectures and, especially, on excursions.

These matters were discussed with various members of the Society, and were officially considered at a Council meeting in January, 1956. There was then general agreement that the Society's activities lacked scientific purpose; that in some cases sectional interests had become diffuse, and in others had almost disappeared. It was also the general opinion that, since the days of the 1901 Clyde List and the 1928 Card Catalogue, there had been a serious decline in the quality of the work done by the Society.

The Council decided that evening that an effort should be made to sharpen the interest of our own members, as well as of the general public, in the Society's activities. It also resolved not to attempt any temporary remedies, but to embark on a long-term policy of re-organisation. It appointed a small sub-committee to consider the



position and in due course to report. During the next nine months the sub-committee met some fourteen times, and in October, 1956, its report was presented to the Council.

The recommendations of the sub-committee covered a wide range of topics, and in some cases involved fundamental changes in the Society's way of life. The Council approved these recommendations with few exceptions, and such of them as involved constitutional changes were brought before a special meeting of the Society in December, 1956. As a result, we have recently had alterations in the name of the Society, in the terms and grades of membership and in the allocation of duties among the officers of the Society. While we do not expect any quick spectacular results, feeling that in this case it is safer to hasten slowly, we hope and believe that as a result of these changes the pulse of the Society will be quickened and that when, in September, 1958, the British Association meets in Glasgow, it will be welcomed by a Natural History Society equipped to take its share of the responsibilities of the time.

R. MACKECHNIE,

*President of the Society.*

## DIGEST OF THE PROCEEDINGS OF THE SOCIETY

### 10TH JANUARY, 1956.

Mr. Robert Mackechnie presided.

Dr. James D. Robertson, 7 Lochaber Road, Bearsden, was admitted to membership of the Society.

Mr. C. Eric Palmar, A.R.P.S., convened the exhibition of the photographic section, which included films, colour transparencies and other slides, largely the work of Miss J. C. D. Craig, Mr. B. W. Ribbons, Mr. A. Slack and Mr. Palmar.

### 14TH FEBRUARY, 1956.

Mr. Robert Mackechnie presided over the Annual General Meeting.

Two new members were admitted to the Society: Mr. John L. Gay, B.Sc., M.Sc., 145 Westland Drive, Glasgow, W.4, and Mr. Robert Morrison, 22 Clydeview Drive, Greenock.

Reports of the Society's activities were read, and on Miss Woodland's retiring from the post of Minute Secretary, the President paid tribute to her many years of excellent work. New office-bearers were elected (see p. 286).

### 13TH MARCH, 1956.

Mr. Robert Mackechnie presided.

Miss Isabel K. Munro, B.Sc., 9 Athole Gardens, Glasgow, W.2, was admitted to membership of the Society.

Miss Winifred U. Flower of Jordanhill Training College gave a lecture entitled "To Australia for Birds." The lecture was illustrated by lantern slides, and by sketches and other exhibits.

### 16TH APRIL, 1956.

Mr. Robert Mackechnie presided.

Professor K. W. Braid read a report on the activities of the Field Studies Association. One of the members of the Society, Mr. A. Herriot, gave a talk entitled "A geological holiday in Arran" which was illustrated by lantern slides and exhibits.



14TH MAY, 1956.

Mr. Robert Mackechnie presided.

Mr. A. E. Robinson, c/o Steven, 66 Mossspark Oval, Glasgow, S.W.2, was admitted to membership of the Society.

A lecture on ecological aspects of St. Kilda was given by Mr. J. Morton Boyd.

11TH JUNE, 1956.

Mr. Robert Mackechnie presided.

Two new members were admitted to the Society: Mr. John R. F. Richardson, 164 Keppochhill Road, Glasgow, N.1, and Mr. Alexander J. R. Allan, 63 Appin Road, Glasgow, W.1.

Reports of various excursions were read by Messrs. John Boyd and J. D. Forrest, and by Professor K. W. Braid. Mr. Thomas Robertson submitted his list of first arrivals of summer migrants for the Clyde Area for 1956. The annual "Exhibit Night" followed this and included displays of specimens from all sections of the Society.

25TH SEPTEMBER, 1956.

A *Conversazione* was held in the Department of Botany, University of Glasgow. A series of exhibits had been prepared by various members of the Society.

9TH OCTOBER, 1956.

Mr. Robert Mackechnie presided.

Miss C. L. Martin, M.A., 121 Novar Drive, Glasgow, W.2, was admitted to membership of the Society. Mr. Peter Belton, B.Sc., A.R.C.S., F.R.E.S., delivered a lecture entitled "Hearing and sound production in Moths," which was illustrated by lantern slides and audible effects.

13TH NOVEMBER, 1956.

Mr. Robert Mackechnie presided, and intimated that certain changes in the Constitution of the Society would be discussed at the next meeting.

Professor D. A. Herbert, Department of Botany, University of Queensland, delivered a lecture on the vegetation of Australia, which was illustrated by colour transparencies.

11TH DECEMBER, 1956.

Mr. James S. Nicol, Vice-President, was in the chair.

The President, Mr. Robert Mackechnie, sent his apologies for absence through illness along with a detailed communication on the proposed changes in the constitution of the Society. After a lengthy discussion a series of resolutions involving constitutional changes, was moved and carried. A report of these changes appears above.

## ANDERSONIAN NATURALISTS OF GLASGOW

### LIST OF MEMBERS

#### Honorary Members.

- 1951 ANDERSON, Sir David S., B.Sc., Ph.D., Royal College of Science and Technology, Glasgow, C.1.  
 1951 BERRY, John, M.A., Ph.D., F.R.S.E., The Nature Conservancy, 12 Hope Terrace, Edinburgh, 9.  
 1951 HETHERINGTON, Sir Hector J. W., K.B.E., LL.D., University of Glasgow.

#### Life Members.

- 1920 EWING, Raymond, 6 Glennan Gardens, Helensburgh.  
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 1911 GILMOUR, Colin C. B., M.A., M.B., Ch.B., Memorial Hospital, Midland Road, Kettering, Northants.

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- 1951 ADAMS, Samuel, 67 Leslie Street, Motherwell.  
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 1951 BOYLE, Mrs. A. R., 41 Allanton Avenue, Ralston, Paisley.  
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 1951 BROCK, Miss Elizabeth R., M.A., 15 Victoria Street, Dumbarton.  
 1948 BROWN, Andrew Hamilton, 144 Woodlands Road, Glasgow, C.3.  
 1932 BROWN, James I., 45 Baldwin Avenue, Glasgow, W.3.  
 1926 BUCHANAN, David, 7 Hillfoot Avenue, Rutherglen.  
 1941 BURMAN, Arthur Duncan, 41 Trinley Road, Glasgow, W.3.  
 1957 BURNS, Miss Ann, 616 Tollcross Road, Glasgow, E.2.  
 1957 BURNS, Miss Ray, 616 Tollcross Road, Glasgow, E.2.  
 1942 CAMERON, Mrs. Ella B., 273 Knightswood Road, Glasgow, W.3.  
 1942 CAMERON, J. Inglis, M.B., Ch.B., F.R.F.P.S.(Glas.), 273 Knightswood Road, Glasgow, W.3.  
 1957 CAMPBELL, John G. C., B.Sc., Dip.Bact., Department of Microbiology, Royal College of Science and Technology, Glasgow, C.1.  
 1943 CAMPBELL, Roderick S. F., M.R.C.V.S., 32 Eastercraigs, Glasgow, E.1.  
 1932 CAMPBELL, William C., 440 Kingsbridge Drive, Rutherglen.  
 1938 CANNON, William John, F.G.S., Criminal Records Office, C.I.D., P.O. Box 585, Dar-es-Salaam, Tanganyika. (President, 1955.)  
 1919 CARMICHAEL, Mrs. Chris. P., 119 Montrose Street, Glasgow, C.4.

- 1950 CASE, Miss Isobel M., M.A., B.Sc., Ph.D., 22 Queen's Gate, Glasgow, W.2.
- 1935 CHAPMAN, Miss Jessie, 46 Strathcona Drive, Glasgow, W.3.
- 1951 CLIMIE, Miss Allina J., B.Sc., 28 Etive Drive, Giffnock.
- 1952 CONACHER, Miss Elizabeth R. T., An Fharaid, Lawmarnock Road, Bridge of Weir.
- 1952 CONACHER, Mrs. G. M. T., An Fharaid, Lawmarnock Road, Bridge of Weir.
- 1952 CONACHER, Miss Nancy C. T., An Fharaid, Lawmarnock Road, Bridge of Weir.
- 1957 CONWAY, Mrs. Elsie, B.Sc., Ph.D., Department of Botany, University of Glasgow.
- 1957 COWAN, Robert J. C., 75 Ormonde Avenue, Glasgow, S.4.
- 1935 CRAIG, Miss Jean C. D., B.Sc., A.R.I.C., 2 Devonshire Gardens, Glasgow, W.2.
- 1949 CROMBIE, IAIN L., B.Sc., 9 Carrick Drive, Glasgow, E.2.
- 1957 CROSS, Mrs. Amy, B.Sc., 556 Tollcross Road, Glasgow, E.2.
- 1955 CROWSON, Mrs. Elizabeth, B.Sc., 1012 Great Western Road, Glasgow, W.2.
- 1955 CROWSON, Roy A., B.Sc., A.R.C.S., D.I.C., 1012 Great Western Road, Glasgow, W.2.
- 1950 CRUNDWELL, A. C., B.A., Department of Botany, University of Glasgow.
- 1932 CURRIE, Miss Betsy, L.L.A., Claddach, Portnahaven, Islay.
- 1953 CURRIE, Miss Catherine, 88 Norse Road, Glasgow, W.4.
- 1916 DALLAS, William, F.R.I.C., A.M.I.Chem.E., 960 Sauchiehall Street, Glasgow, C.3.
- 1955 DAVIDSON, Miss Maureen K., The Hostel, Auchincruive, Ayr.
- 1907 DAVIDSON, W. Cameron, M.B., Ch.B., 4 Wellswood Park, Torquay.
- 1951 DAWSON, Miss Christine O., B.Sc., Anderson College, Dumbarton Road, Glasgow, W.1.
- 1957 DEMPSEY, Mrs. Edith, 24 Dowanside Road, Glasgow, W.2.
- 1955 DICKSON, James H., 3 Rhynie Drive, Glasgow, S.W.1.
- 1957 DICKSON, Miss Rhona M., 5 Lochaline Drive, Glasgow, S.4.
- 1951 DONNELLY, Joseph, B.Sc., M.A.F.F. (Animal Health Division), Field Research Laboratory, Blackford, Carlisle.
- 1957 DRYSDALE, Miss Agnes, 9 Marchmont Terrace, Observatory Road, Glasgow, W.2.
- 1939 DUNLOP, Miss Eva, M.A., B.Sc., 11 Grosvenor Crescent, Glasgow, W.2.
- 1949 DUNN, Miss Isabella J., M.A., 41 Drumsargard Road, Burnside, Rutherglen.
- 1943 DUNNACHIE, Miss A. Denise H., M.A., 7 Bowling Green Road, Glasgow, E.2.
- 1949 EGLINTON, S. E., Mena House, Station Road, Law Junction.
- 1957 ELDER, Mrs. Flora M., B.Sc., 27 Mitchell Drive, Rutherglen.
- 1954 EMERSON, Miss N. R., 18 Carrington Street, Glasgow, C.4.
- 1957 FERGUSON, Alexander, 22 Todhills, East Kilbride.
- 1957 FERGUSON, Mrs. Mona G. R., 22 Todhills, East Kilbride.
- 1955 FERGUSON, Mrs. S. Wallace, 16 Brighton Place, Glasgow, S.W.1.
- 1951 FISHER, Robert E., 366 Clarkston Road, Glasgow, S.4.
- 1939 FORBES, Edward J., M.A., 9 Agnew Avenue, Coatbridge.
- 1945 FORREST, Archibald, 1381 Pollokshaws Road, Glasgow, S.1.
- 1933 FORREST, James, 21 Greystone Avenue, Rutherglen.
- 1955 FORREST, James D., B.Sc., M.S., Department of Botany, West of Scotland Agricultural College, Glasgow, C.2.
- 1953 GARDNER, Miss Isobel C., B.Sc., 120 Broomhill Drive, Glasgow, W.1.



- 1941 GARDNER, J. Allan, 21 Wilson Street, Airdrie.
- 1937 GAY, Mrs. J. H., 1328 Pollokshaws Road, S.1.
- 1956 GAY, John L., B.Sc., M.Sc., 145 Westland Drive, Glasgow, W.4.
- 1951 GIBSON, J. A., M.B., Ch.B., M.B.O.U., F.Z.S., 39 Strathmore Avenue, Ralston, Paisley; and Foxbar House, near Paisley.
- 1947 GOOD, Rankine, M.D., D.P.M., Ashgrove, Hartwood, Shotts.
- 1951 GORDON, James, c/o John Henderson, 16 Springhill Gardens, Glasgow, S.1.
- 1943 GORDON, T. H. M., 71 Croftmont Avenue, Croftfoot, Glasgow, S.4.
- 1954 GORMLEY, Francis, B.A., 116 Quarrybrae Street, Glasgow, E.1.
- 1954 GOWANS, Alexander M., 83 Brockburn Road, Glasgow, S.W.3.
- 1950 GRAY, Alexander M., 22 Woodvale Avenue, Giffnock.
- 1953 HAMILTON, James D., B.Sc., 97 Kingsheath Avenue, Rutherglen.
- 1947 HAMILTON, Thomas, B.Sc., 21 Hyndford Road, Lanark.
- 1955 HENDERSON, Andrew E., B.Sc., Department of Zoology, University of Glasgow.
- 1955 HERRIOTT, A., 6 Threestonehill Avenue, Glasgow, E.2.
- 1951 HILL, Alexander R., B.Sc., Ph.D., F.R.E.S., 35 Rowallan Gardens, Glasgow, W.1.
- 1937 HODGE, Robert, 85 Ashdale Drive, Glasgow, S.W.2.
- 1942 HOLLOWAY, Lionel Edgar, F.G.S., Ravenscraig, 61 Paisley Road, Renfrew.
- 1951 HOPPING, C. A., B.Sc., Department of Palaeontology, N.V. de Bataafshe, Petroleum Maatschappij, Cavel van Bylandelaan, 30, The Hague, Netherlands.
- 1954 HUNTER, Mrs. Myra Russell, Tigh-na-seilge, Cardross, Dunbartonshire.
- 1948 HUNTER, W. Russell, B.Sc., Ph.D., M.I.Biol., F.L.S., F.G.S., Department of Zoology, University of Glasgow.
- 1947 HUTCHISON, Miss Anna R., B.Sc., 9 Athole Gardens, Glasgow, W.2.
- 1951 HUTCHINSON, Stephen A., T.D., B.Sc., Ph.D., Department of Botany, University of Glasgow.
- 1957 JOHNSTONE, Miss Alice J., 4111 Melrose Avenue, Montreal 28, P.Q., Canada.
- 1935 JOHNSTONE, Robert H., M.A., 726 Anniesland Road, Glasgow, W.4.
- 1946 KEANEY, Thomas, B. Sc., 3 Muslin Street, Glasgow, S.E.
- 1954 KELLOCK, Edwin, Scapa House, St. Ala, Orkney.
- 1951 KENNEDY, Alexander, 77 Castlemilk Crescent, Glasgow, S.4.
- 1935 KIRKWOOD, James, 11 Dunchurch Street, Oldhall, Paisley.
- 1957 LAIRD, Miss Annie, B.Sc., 14 Haldane Place, Murray III, East Kilbride.
- 1954 LAND, Miss Edna H., 7 Millbrae Crescent, Glasgow, S.2.
- 1885 LEE, John R., M.A., 96 Finlay Drive, Glasgow, E.1. (President, 1911-1914, 1930-1933.)
- 1944 LEITCH, Archibald, B.Sc., 8 Mainhill Place, Baillieston.
- 1953 LENNOX, Mrs. Dorothea A., 108 Buccleuch Street, Glasgow, C.3.
- 1953 LENNOX, William M., 108 Buccleuch Street, Glasgow, C.3.
- 1934 LLOYD, Miss Blodwen, M.Sc., Ph.D., 122 University Avenue, Glasgow, W.2.
- 1945 LOTHIAN, Daniel M., 4 Murray Square, Murray XI, East Kilbride.
- 1954 McALISTER, Miss Isobel M., 3 Woodend Drive, Glasgow, W.3.
- 1941 McCALLUM, Miss Ada H., B.Sc., 22 Terregles Ave., Glasgow, S.1.
- 1951 MacCALLUM, William, 11 Ravenscraig Terrace, Glasgow, S.W.3.
- 1942 McCLELLAND, S., M.A., 62 Torland Road, Hartley, Plymouth.
- 1946 McCOLM, Miss Margaret G., 10 Borden Road, Glasgow, W.3.



- 1952 McCOMBIE, Miss Margaret, 28 Westbourne Gardens, Glasgow, W.3.
- 1951 MACCONNELL, Joseph T., B.Sc., Ph.D., 160 Gartocher Road, Glasgow, E.2.
- 1952 McCROSTIE, Charles, 25 Asheroft Drive, Glasgow, S.4.
- 1939 McCULLOCH, Mrs. Ella, Netherlee, 16 Victoria Drive, Troon.
- 1951 McCULLOCH, Miss Muriel, 27 First Avenue, Glasgow, S.4.
- 1953 MACDONALD, Miss A. D., 22 Munro Road, Glasgow, W.3.
- 1954 MACDOUGALL, Miss Elizabeth, 1503 Dumbarton Road, Glasgow, W.4.
- 1954 MCFADZEAN, Francis H. V., 133 Stevenson Street, Glasgow, S.E.
- 1951 MCFARLANE, Miss Beth K., Porterswell, Uddingston.
- 1923 MACFARLANE, Miss B. P., M.A., 2 Mosswell Drive, Milngavie.
- 1944 MACFARLANE, Charles Duncan, 67 Henderland Road, Bearsden.
- 1944 MACFARLANE, Mrs. Elizabeth Adamson, 67 Henderland Road, Bearsden.
- 1951 MCGHIE, Henry J. G., M.A., 18 Newton Street, Glasgow, C.2.
- 1950 MCINTYRE, Charles T., 58 Easterhill Place, Glasgow, E.2.
- 1957 MACKECHNIE, Mrs. E., 9 Skirving Street, Glasgow, S.1.
- 1924 MACKECHNIE, Robert, B.Sc., A.L.S., 9 Skirving Street, Glasgow, S.1. (President, 1955- )
- 1957 McKELLAR, Miss Jean B., B.Sc., 18 Nethervale Avenue, Glasgow, S.4.
- 1953 MACKINNON, Donald, B.Sc., 70 Waldemar Road, Glasgow, W.3.
- 1944 MACLAURIN, Alan M., Oldhall House, Kilmacolm.
- 1953 McLEAN, Miss Ann, 101 Gala Street, Glasgow, E.1.
- 1951 MACLEAY, Kenneth Noel Grant, B.Sc., Ph.D., F.L.S., Department of Botany, Gordon Memorial College, Khartoum, Sudan.
- 1955 MACLENNAN, David, 151 New City Road, Glasgow, C.4.
- 1952 MACLEOD, Miss Jean C., Backhill Cottage, East Hallside, Cambuslang.
- 1954 McNEIL, Mrs. Hilda M., M.B., Ch.B., 103 Randolph Road, Glasgow, W.1.
- 1927 MACQUEEN, John, 47 Marlborough Road, Newport, Monmouth. (Corresponding Member.)
- 1945 MACRAE, Miss Jean G., M.A., 170 Airbles Road, Motherwell.
- 1957 McTEAGUE, Miss Dorothy, B.Sc., Department of Botany, University of Glasgow.
- 1956 MARTIN, Miss C. L., M.A., 121 Novar Drive, Glasgow, W.2.
- 1951 MAXWELL, Mrs. Catherine Dow, 31 Garthland Drive, Glasgow, E.1.
- 1954 MILLAR, Miss Kathleen J., B.Sc., 23 Milner Road, Glasgow, W.3.
- 1949 MILLER, John G., Bon Accord, James Street, Dalry, Ayrshire.
- 1920 MILNE, James Fairweather, M.A., M.B., Ch.B., Rocksley House, Boddam, Peterhead.
- 1957 MOFFAT, Miss Margaret, Nethercroft, 21 Allanshaw Street, Hamilton.
- 1931 MORGAN, Charles J. E., 41 Newfield Square, Glasgow, S.W.3.
- 1954 MORRISON, Charles Murchland, 119 Balshagray Avenue, Glasgow, W.1.
- 1956 MORRISON, Robert, 22 Clydeview Road, Greenock.
- 1953 MORTIMER, H. M., 56 Croftburn Drive, Glasgow, S.4.
- 1954 MORTON, James D., 129 Woodstock Avenue, Glasgow, S.1.
- 1943 MOWAT, G. T., M.B., Ch.B., F.R.C.S.(Edin.), 20 Sandyford Place, Glasgow, C.3.
- 1957 MUIR, Miss Jessie P., 19 Hertford Avenue, Glasgow, W.2.
- 1949 MUNRO, Alastair C., B.Sc., 122 Queen's Drive, Glasgow, S.2.
- 1956 MUNRO, Miss Isabel K., B.Sc., 9 Athole Gardens, Glasgow, W.2.
- 1957 MUNRO, Miss Joan M. L., 15 Woodend Drive, Glasgow, W.3.

- 1947 MUNRO, Robert K., M.A., B.Sc., 15 Woodend Drive, Glasgow, W.3.
- 1953 MUNRO, Miss Sheila M., M.A., 469 Kilmarnock Road, Glasgow, S.3.
- 1951 MURRAY, Murdo, B.Sc., 50 Swainbost, Ness, Stornoway.
- 1953 NICOL, Mrs. Catherine S., 27 Kingshouse Avenue, Glasgow, S.4.
- 1939 NICOL, Mrs. Gladys, 20 Brora Drive, Giffnock.
- 1939 NICOL, James S., 20 Brora Drive, Giffnock.
- 1942 OSBORNE, Henry, 237 West George Street, Glasgow, C.2.
- 1948 PALMAR, Charles Eric, M.B.O.U., A.R.P.S., 5 University Avenue, Glasgow, W.2.
- 1935 PALMAR, Mrs. Mary, B.Sc., 5 University Avenue, Glasgow, W.2.
- 1941 PARKINSON, Samuel, 22 Lindsay Drive, Glasgow, W.2.
- 1949 PATERSON, George D., 65 Smithycroft Road, Glasgow, E.1.
- 1957 PATON, David Keir, 42 Hawthorn Walk, Cambuslang.
- 1910 PATTON, Donald, M.A., B.Sc., Ph.D., F.R.S.E., 15 Jordanhill Drive, Glasgow, W.3. (President, 1926-1929, 1952-1954.)
- 1944 PETRIE, Miss Winifred, M.A., 8 Drumlin Drive, Milngavie.
- 1927 PHILLIPS, Major G. W., A.M.I.Mech.E., F.Z.S., 69 Deanwood Avenue, Glasgow, S.4.
- 1949 PIRIE, Mrs. A. May, M.A., 6 Mossspark Road, Milngavie.
- 1931 PIRRET, John, 133 Mansel Street, Glasgow, N.
- 1936 PRASHER, Richard, 6 Craig Avenue, Dalry, Ayrshire.
- 1951 PRENTICE, Miss Margaret McL. C., M.A., 263 Churchill Drive, Glasgow, W.1.
- 1955 REID, Kenneth J., 274 Croftpark Avenue, Glasgow, S.4.
- 1901 RENNIE, William, c/o Inglis, 69 Dunottar Street, Glasgow, E.1.
- 1915 RENOUF, Prof. Louis Percy Watt, B.A., Ph.D., D.Sc., M.R.I.A., F.R.S.E., St. Philomena's, Tivoli, Cork.
- 1950 RIBBONS, Basil W., B.Sc., M.I.Biol., F.L.S., Department of Botany, University of Glasgow.
- 1956 RICHARDSON, John R. F., 164 Keppochhill Road, Glasgow, N.1.
- 1940 ROBERTSON, Ian, B.L., 250 Churchill Drive, Glasgow, W.1.
- 1956 ROBERTSON, James D., B.Sc., Ph.D., F.R.S.E., 7 Lochaber Road, Bearsden.
- 1902 ROBERTSON, Mrs. Margaret, 71 Mearns Road, Clarkston.
- 1934 ROBERTSON, Thomas, 71 Mearns Road, Clarkston.
- 1956 ROBINSON, Albert E., c/o Steven, 66 Mossspark Oval, Glasgow, S.W.2.
- 1953 RODDAM, Rupert, 40 Linthuagh Road, Glasgow, S.W.3.
- 1957 ROWE, Peter D., 31 St. Ronan's Drive, Glasgow, S.1.
- 1935 SCOBIE, John, 7 Balmuildy Road, Bishopbriggs.
- 1951 SCOTT, George D., B.Sc., Ph.D., Department of Botany, University of Glasgow.
- 1931 SCOTT, Miss Mabel G., M.A., B.Sc., 29 Shawhill Road, Glasgow, S.1.
- 1952 SCOTT, William A., B.Sc., 63 High Street, Lanark.
- 1952 SHANKLAND, Thomas E., 8 Grampian Street, Glasgow, E.2.
- 1951 SINCLAIR, Frank L., M.A., 12 Arlington Street, Glasgow, C.3.
- 1951 SKINNER, William K., 60 Otago Street, Glasgow, W.2.
- 1948 SLACK, Alfred, B.Sc., 195 Wilton Street, Glasgow, N.W.
- 1954 SLACK, Mrs. Martha W., 195 Wilton Street, Glasgow, N.W.
- 1951 SMITH, David L., Hollinside, Manor Road, Utley, Keighley.
- 1944 SMITH, James, 55 Buchanan Drive, Hillfoot, Bearsden.
- 1952 SPENCE, David H. N., B.Sc., Ph.D., Department of Botany, University of St. Andrews.
- 1953 STEEL, Robert, 9 Lindsay Place, Glasgow, W.2.
- 1910 STEWART, E. J. A., M.A., B.Sc., 8 Manor Road, Glasgow, W.4.

- 1943 STEWART, John S. S., M.B., Ch.B., 244 West Princes Street, Glasgow, C.4.
- 1951 STIRLING, Allan McG., c/o Y.M.C.A., The Old Palace, Chester.
- 1943 STOLLERY, Ernest, W. R., North Kessock, Inverness.
- 1943 SYME, Victor M., 41 Maxwell Avenue, Westerton.
- 1951 TAYLOR, John, 26 Glentyan Avenue, Kilbarchan.
- 1944 THOMSON, Miss Isabel P., 21 Keir Street, Glasgow, S.1.
- 1953 THRIPPLETON, A. A., A.R.P.S., A.M.I.E.I., 14 Portland Park, Hamilton.
- 1954 TURNER, James Hillis, A.M.I.Prod.E., A.U.A., address unknown.
- 1950 WALKER-LOVE, James, B.Sc.(Agr.), N.D.A., N.D.D., 13 Park Place, Lanark.
- 1947 WALLACE, Miss Alison Y. M., M.A., 5 Princes Terrace, Prince Albert Road, Glasgow, W.2.
- 1936 WALTON, Prof. John, M.A., D.Sc., Sc.D., LL.D., F.R.S.E., Department of Botany, University of Glasgow. (President, 1946-1948.)
- 1947 WANLESS, Rev. John B., F.R.M.S., 25 Beechwood Street, Sunderland, Co. Durham. (Corresponding Member.)
- 1951 WARK, Robert M., 3 Woodlea Drive, Giffnock.
- 1944 WATT, James A., 3 Glen Road, Glasgow, E.2.
- 1946 WEIR, John S., B.Sc., Ph.D., Department of Zoology, The University, Birmingham, 15.
- 1952 WILLIAMS, Samuel, Ph.D., D.Sc., F.R.S.E., Department of Botany, University of Glasgow.
- 1954 WILSON, Miss E. J., M.A., 15 Hathaway Drive, Giffnock.
- 1949 WILSON, Miss Isabel B., M.A., 122 University Avenue, Glasgow, W.2.
- 1934 WOOD, James R., C.A., Auchendennan, Alexandria.
- 1953 WOODGER, A. G., 11 Daleview Avenue, Glasgow, W.2.
- 1926 WOODLAND, Miss Phyllis, 129 Maxwellton Avenue, East Kilbride.
- 1945 YONGE, Prof. C. M., C.B.E., Ph.D., D.Sc., F.R.S.E., F.R.S., Department of Zoology, University of Glasgow.
- 1931 YOUNG, Miss Gertrude A., Mansefield, Arrochar, Dunbartonshire.
- 1957 YOUNG, John, Reidvale Street, Glasgow, E.1.
- 1931 YUILL, Miss Annie, 194 Drymen Road, Bearsden.

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## INDEX to Vol. XXVII

- Aberdeen botanist, Dr. James Cargill, Braid, 127-128.  
 Acknowledgments, 65, 159, 256.  
 Additions, Flora of Clyde Area, Lee, 65-82.  
 Address, Presidential, 105-126.  
 Algae, 125-126.  
 Amphibious snail, *Succinea*, in new habitat, Hunter, 91.  
 Ancient volcanoes of western Scotland, King, 36-37.  
*Ancylus*, with *Plumatella* in mountain lochan, Hunter and Hunter, 241-242.  
 ANDERSON, James, 15-16, 27, 28, 98-99, 261.  
 Andersonian Naturalists of Glasgow, 288-289, 291, title-page.  
 Andersonian Naturalists' Society, 8.  
 Animal ecology in Garvelloch Islands, Hunter, 147-150.  
 Ants, territory in, Brian, 37-38.  
 Aphids, Hill, 156.  
 Appreciation, An, 263.  
 Arctic-alpine flora, note on, Boyd, 16-17.  
*Arenaria norvegica*, 83.  
 Arrival of Summer Birds, Robertson, 46-47, 93-94, 151-152, 212-213, 236-240, 257-258, 284-285.  
*Asplenium lanceolatum*, 68, 82.  
*Asplenium obovatum*, 68, 82.  
 Association of fungi with bryophytes, 45.  
  
 BARNES, H., 193-204.  
 Beetles of the family Clambidae, Crowson and Crowson, 205-206.  
 Ben Lawers, centenary excursion, 15, 188.  
 Ben Lawers—past and present, Lee and Patton, 184-188.  
 Bird observatory, Isle of May, Meiklejohn, 39-41.  
 Birds, Arrival of Summer, Robertson, 46-47, 93-94, 151-152, 212-213, 236-240, 257-258, 284-285.  
 Birds, Arrival of Summer—Summary of results, Robertson, 236-240.  
 Birds of Garvelloch Islands, Dunn, Hunter and Dunn, 142-146.  
 Boreray, St. Kilda, Lumbricidae, Boyd, 280-281.  
 BOYD, J. Morton, 280-281.  
 BOYD, John, 2, 16-18, 29, 50-51, 99, 153, 215, 287-288.  
 BRAID, K. W., 1-2, 11, 19, 20-21, 26, 31, 92, 96-97, 127-128, 153-154, 287.  
 BRIAN, M. V., 37-38.  
 British Association, 50-51, 95-96.  
 British Herbarium in Glasgow University, Patton, 105-126.  
 British Species *Cyclops*, key, Slack, 250-256.  
 Bryophytes, 45, 123-124, 221-229, 264-271, 279.  
 Bryophytes, association of fungi with, 45.  
 BUCHANAN, David, 26.  
  
*Calypptomerus*, 205-206.  
 CAMERON, J. Inglis, 23, 26.  
 CANNON, William John, 2, 24-35, 54-55, 189-192.  
 CARGILL, Dr. James, an early Aberdeen botanist, Braid, 127-128.  
 Centenary celebrations (1951):  
   Dinner, centenary, 19-23.  
   Exhibition, centenary, 23-35.  
   First Minute of Society, facsimile, 3.  
   Foreword to centenary number, 1-2.  
   Glasgow's Natural History Societies, 8-10.  
   History of Society, 4-6.  
   List of Presidents, 7.  
   Public lecture, 13-14.  
   Special excursions, 15-18.  
   Thanksgiving service, 11-13.  
 Changes in constitution, Recent, Mackechnie, 288-289.  
 Charr, A new sub-species from Loch Eck, Friend, 219-220.  
 Clambidae, beetles of the family, Crowson and Crowson, 205-206.  
*Clambus*, 205-206.  
 Climatological data Millport, 193-204.  
 Clyde Area Flora, Additions, Lee, 65-82.  
 Clyde Hydromedusae, Vannucci, 243-249.  
 Clyde Hydromedusae, Correction, Vannucci, 281.  
 Clydesdale Fungi, records, Johnstone, 49, 282.  
 Clydesdale Naturalists' Society, 9.  
 Clyde Sea Area, 193-204, 243-249, 281.  
 Constitution, Recent changes, Mackechnie, 288-289.  
 CONWAY, E., 125-126.  
 COPLAND, W. O., 230-235.  
 Corrections, Lee, 159.  
 Correction, Vannucci, 281.  
*Cottus gobio*, new record, 48.  
 CRAIG, Jean C. D., 2, 23, 50.  
 CROMBIE, Iain L., 154.



- CROWSON, E. A. (with CROWSON, R. A.) 205-206.  
 CROWSON, R. A., 205-206.  
 CRUNDWELL, A. C., 123-124, 221-229, 264-271, 279.  
*Cyclops*, key British species, Slack, 250-256.
- Dendrocopus major*, Braid, 92.  
 DELANY, M. J., 272-278.  
 Digest proceedings Society, 57-59, 103-104, 156-157, 216-217, 261-262, 289-290.  
 Dinner, centenary, 19-23.  
 Dunbartonshire Liverwort Flora, Crundwell, 264-271.  
 Dunbartonshire moss flora, Crundwell, 221-229.  
 Dunbartonshire Oakwood, Mammals, Delany, 272-278.  
 DUNN, Alasdair (with DUNN, M. H. and HUNTER, W. RUSSELL) 142-146.  
 DUNN, Margaret H., 142-146.
- Ecology, animal, of Garvelloch Islands, Hunter, 147-150.  
 Endemicism in the snails of Jamaica, Hunter, 173-183.  
 Excursion reports, 15-18, 51-52, 96-99, 153-154.  
 Excursion and sectional reports, 215, 260-261, 287-288.  
 Excursions, special centenary, 15-18.  
 Exhibition, centenary, 23-35.
- Field meeting at Killin, centenary, 15-17, 188.  
 First Minute of Society, facsimile, 3.  
 Fishes, observations on, Cannon, 189-192.  
 Flora, arctic-alpine, Boyd, 16-17.  
 Flora of the Clyde Area, Additions, Lee, 65-82.  
 Flora, Possil Marsh, Patton and Rennie 160-172.  
 Flora, Possil Marsh, Additions, Ribbons, 283.  
 Foreword to centenary number, 1-2.  
 FORREST, J. D., 287.  
 FRASER, James P., 3.  
 FRIEND, G. F., 219-220.  
 Fungi, 45, 49, 282.  
 Fungi, association with bryophytes, 45.
- Galium* spp., 69-70, 75.  
 Garvelloch Islands, papers on, 129-150.  
 Geological Society of Glasgow, 9.  
 Geological structure of Garvelloch Islands, Hunter and Muir, 129-139.  
 Glasgow Botanical Society, 9.  
 Glasgow Corporation Public Libraries, 27.  
 Glasgow Eastern Botanical Society, 8.  
 Glasgow Mechanics' Institution, 10.  
 Glasgow Natural History Societies, 8-10.  
 Glasgow Naturalists' Society, 8.  
 Glasgow Practical Naturalists' Society, 8.  
 Glasgow Royal Botanic Institution, 9.  
 Glasgow Society of Field Naturalists, 8.  
 Glasgow University, British Herbarium Patton, 105-126.  
 GLEN, Mrs. Mary, 26.  
 GORDON, Thomas H., 60-62.  
 GRAHAM, James, 26, 27, 35, 42-44, 95.  
 Grey Squirrel, new record, 48.
- HENDERSON, Rev. Professor Ian, 11-13.  
 \*HENDERSON, S. M. K., 2, 35.  
 Herbarium, British in Glasgow University, Patton, 105-126.  
 HILL, Alex. R., 30, 156.  
 History, Ben Lawers, Lee and Patton, 184-188.  
 History of Society, 4-6.  
*Homogyne alpina*, new record, 48.  
 HUNTER, Myra RUSSELL, (with HUNTER W. RUSSELL) 241-242.  
 HUNTER, W. RUSSELL, 48, 84-88, 91, 129-139, (with DUNN, M. H.) 142-146, 147-150, 153, 173-183, 207, 211, 241-242.  
 HUTCHISON, A. R., 30.  
 Hydromedusae of Clyde, Correction, Vannucci, 281.  
 Hydromedusae of Clyde Sea Area, Vannucci, 243-249, 281.
- Insects from Garvelloch Islands, Muir, 140-141.  
 Introduction to spiders, Graham, 42-44.  
 Isle of May bird Observatory, Meiklejohn, 39-41.  
 Isles of Seilly, Ribbons, 41-42.  
 Isles of the Sea, see Garvelloch Islands.
- Jamaica, endemic snails of, Hunter, 173-183.  
 JOHNSTONE, R. H., 2, 21-22, 49, 158, 263, 282.
- Killin, centenary field meeting, 15-17, 188.  
 KING, B. C., 36-37.  
 KING, L. A. L., 60.  
 KIRKWOOD, James, 28, 51-52, 154, 260.

- Lawers, centenary excursion, 15, 188.  
*Lebistes reticulatus*, 189-190.  
 Lecture, centenary public, 13-14.  
 LEE, John R., 4-7, 17-18, 28, 31, 62-63, 64, 65-82, 159, 184-188, 288.  
 Lepidoptera, 53, 100, 140-141.  
 Lichen new to Scotland, Crundwell, 279.  
 Lismore, Island of, 210-211.  
 List of members, 291-296.  
 List of presidents, 7.  
 Liverwort Flora, Dunbartonshire, Crundwell, 264-271.  
 Loch Lomond, 153, 207-208, 230-235, 250, 272-278.  
 LOTHIAN, D., 53-54, 99, 100, 153, 154.  
 Lumbricidae at Boreray, St. Kilda, Boyd, 280-281.  
 MACKECHNIE, R., 154, 157, 260, 263, 288-289.  
 MACLAURIN, Alan W., 29.  
 MACLEAY, K. N. G., 82-83.  
 Mammals, Dunbartonshire Oakwood, Delany, 272-278.  
 Marine Biological Station, Millport, 14, 52, 96, 98, 153, 193-204, 243-249, 281.  
 Marine biology in West of Scotland, Yonge, 13-14.  
 MAXWELL, Mary, 154.  
 May, bird observatory on Isle of, Meiklejohn, 39-41.  
 MEIKLEJOHN, M. F. M., 39-41.  
 Members, List of, 291-296.  
*Mentha* spp., 69, 79, 159.  
 Microscopical Society, 6, 7, 8.  
 Miller's Thumb, new record, 48.  
 Millport, climatological and salinity data, Barnes, 193-204.  
 Millport, Marine Biological Station, 14, 52, 96, 98, 153, 193-204, 243-249, 281.  
 Minute, Society's first, facsimile, 3.  
 Molluscs, new distribution records of non-marine, Hunter, 48, 84-88, 207-211.  
 Moss flora, Dunbartonshire, Crundwell, 221-229.  
 MUIR, David A., 140-141, (with HUNTER, W. RUSSELL) 129-139.  
 MURRAY, Bailie A. G., 20, 23.  
 Name of Society, 288-289.  
 Natural History Societies, Glasgow's, 8-10.  
 Natural History Society of Glasgow, 4, 7, 8.  
 New members, see list, 291-296.  
 New Records, 48, 49, 65-82, 82-83, 84-88, 89-90, 160-172, 207-211, 219-220, 221-229, 243-249, 264-271, 279, 280-281, 281, 282, 283.  
 220, 221-229, 243-249, 264-271, 279, 280-281, 281, 282, 283.  
 NICOL, James S., 95-96, 101.  
 Non-marine molluscs, new records of, Hunter, 48, 84-88, 207-211.  
 Oakwood, Mammals of Dunbartonshire Delany, 272-278.  
 OBITUARIES :  
 Barr, Rev. Robert, 158.  
 Ewing, Mrs. P., 62-63.  
 Jack, James Robertson, 64.  
 Leslie, John Duncan, 60-62.  
 Meikle, Agnes Adam, 60.  
 Shanks, Archibald, 63-64.  
 Observations on exotic fishes, Cannon, 189-192.  
 OFFICE-BEARERS :  
 56, 102, 155, 214, 259, 286.  
 PALMAR, C. Eric, 25, 26.  
 PALMAR, Mrs. C. E., 30.  
*Paris quadrifolia*, 83.  
 PATTON, Donald, 8-10, 15, 19, 31, 35, 48, 97-98, 105-126, 153, 160-172, 184-188, 260.  
 Pike in Loch Lomond, Copland, 230-235.  
 Plant records, new, MacLeay, 82-83.  
 Plants of Possil Marsh, Patton and Rennie, 160-172.  
 Plants of Possil Marsh, Additions, Ribbons, 283.  
 Plecoptera, list Glasgow area, Sinclair, 89-90.  
*Plumatella*, with *Ancylus* in mountain lochan, Hunter and Hunter, 241-242.  
 Possil Loch and Marsh, map of, 160.  
 Possil Marsh, plants of, Patton and Rennie, 160-172.  
 Possil Marsh, Additional plants of, Ribbons, 283.  
*Potamopyrgus jenkinsi*, 84, 88, 210.  
 PRASHER, R., 29, 52, 53, 63-64, 98, 100, 153, 154, 215, 260, 288.  
 Presidential Address, 105-126.  
 President's centenary foreward, 1-2.  
 Presidents, list of, 7.  
 Proceedings of Society, digest, 57-59, 103-104, 156-157, 216-217, 261-262, 289-290.  
 Public excursions, centenary, 17-18.  
 Public lecture, centenary, 13-14.  
 Records, New, 48, 49, 65-82, 82-83, 84-88, 89-90, 160-172, 207-211, 219-220, 221-229, 243-249, 264-271, 279, 280-281, 281, 282, 283.

- Records of Clydesdale Fungi, Johnstone, 49, 282.
- RENNIE, W., 8, 10, 48, (with PATTON, D.) 160-172.
- RIBBONS, B. W., 2, 41-42, 98, 153, 215, 260, 283.
- ROBERTSON, T., 25, 35, 46-47, 54, 93-94, 100-101, 151-152, 212-213, 236-240, 257-258, 284-285.
- Rumex aquaticus*, 68, 72.
- Salinity data Millport, 193-204.
- Salvelinus alpinus youngei*, Friend, 219-220.
- Saxifraga cernua*, 188.
- Saxifraga rivularis*, 186-187.
- Silly, Isles of, Ribbons, 41-42.
- Scotland, new lichen, Crundwell, 279.
- SCOTT, M. G., 2, 19-35, 99, 215.
- SCOTT, William A., 215, 260.
- Scottish Field Studies Association, 6, 10.
- Scottish Marine Biological Association, 14, 52, 96, 98, 153, 193-204, 243-249.
- Scottish Ornithologists' Club, 10.
- Scottish Society for the Protection of Wild Birds, 10.
- Sectional and Excursion Reports, 215, 260-261, 287-288.
- Section reports, 53-55, 100-101, 154.
- Service, Centenary thanksgiving, 11-13.
- SINCLAIR, Frank L., 89-90, 261.
- Situation and geology of Garvelloch Islands, Hunter and Muir, 129-139.
- SLACK, A. A. P., 48.
- SLACK, F. E., 250-256.
- SLACK, Harry D., 153, 219-220.
- Snails, endemic to Jamaica, Hunter, 173-183.
- Societies, Glasgow's Natural History, 8-10.
- Society, first Minute of, facsimile, 3.
- Society, history of, 4-6.
- Society's Name, 288-289.
- Special centenary excursions, 15-18.
- Spiders, an introduction to, Graham, 42-44.
- Spiranthes Romanzoffiana*, 83.
- Squirrel, Grey, new record, 48.
- St. Kilda, Lumbricidae at Boreray, Boyd, 280-281.
- Sticta sinuosa* Pers., 279.
- Stoneflies, list Glasgow area, Sinclair, 89-90.
- Succinea pfeifferi* in new habitat, Hunter, 91.
- Summer Birds, Arrival of, Robertson, 46-47, 93-94, 151-152, 212-213, 236-240, 257-258, 284-285.
- Territory in ants, Brian, 37-38.
- Thanksgiving service, Centenary, 11-13.
- TODD, Professor James, 20.
- Union Jack Field Club, 10.
- VANNUCCI, M., 243-249, 281.
- Volcanoes, ancient, of western Scotland, King, 36-37.
- WALTON, Professor John, 23, 28, 157.
- WANLESS, Rev. J. B., 27.
- WEIR, John, 30, 96.
- Western Scotland, ancient volcanoes of, King, 36-37.
- West of Scotland, marine biology in, Yonge, 13-14.
- West of Scotland, new plant records, MacLeay, 82-83.
- WOODLAND, Phyllis, 2, 26.
- Woodpecker, Great Spotted, Braid, 92.
- WILLIAMS, S., 45.
- WILSON, Robert, 23.
- YONGE, Professor C. M., F.R.S., 13-14, 243-249.
- YOUNGER, John, 220.
- Zoological Societies in Glasgow, 9-10.
- Zoological Society of Glasgow, 10.

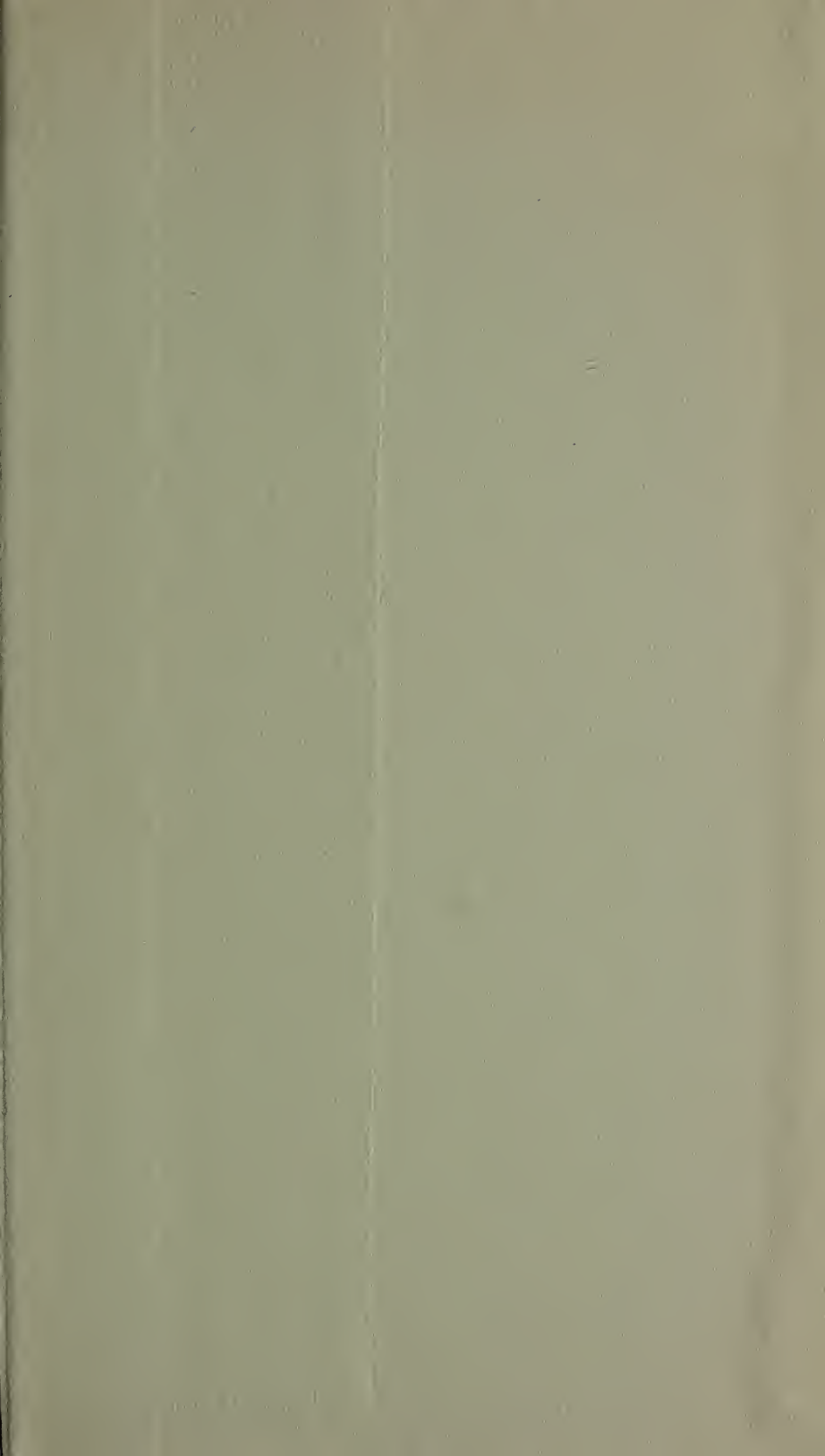














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